

# THE SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona March 2001/Volume 55, No. 1





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# The Garden's Path: *We're starting on a new trail*

*By John Sullivan, President, Board of Trustees*

**T**he Desert Botanical Garden is at this moment in its history poised like a jet at the starting end of the runway.

Our ninth director, Carolyn Polson O'Malley, has moved to a different position in the community, and—at the time of this writing—the Trustees' search committee is reviewing applicants to become the Garden's tenth director. There are a number of strong candidates and the committee is giving them a careful, unhurried look. In the meantime, the Garden is in the capable hands of our Trustee-appointed interim director Dr. William Huizingh. Dr. Huizingh is a Trustee of many years' standing and has served the Board in many capacities, including that of president.

Carolyn, who originally had no intention of seeking the director's job, served as acting director in 1994 while the Garden looked for Dr. Robert Breunig's successor. After a search of many months the Board turned to her and finally persuaded her to accept the position. During Carolyn's tenure, the Garden achieved many milestones: In technology, the starter computer system was upgraded to include each deskpace, the Core Garden was mapped and stored on disk, plant records were placed into a database and made accessible via the internet, a new telephone system replaced the few lines into the Garden and provided greatly expanded service to all staff. In other areas, the Garden completed and dedicated a \$2 million, five-year redesign of its trail system,



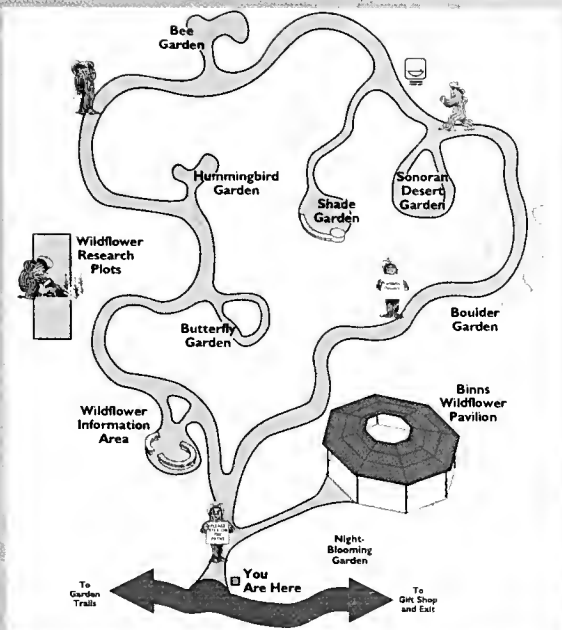
John Sullivan

including new signage and the renovated Sonoran Desert Nature Trail. The staff grew in size but the Garden continually operated within its budget. A 401(K) retirement investment plan as well as a program of enhanced benefits were instituted for the staff. And very importantly, the Garden's accreditation was renewed by the American Association of Museums.

Undeniably, the single greatest Garden project occurred in the Garden's 60th year when we launched a capital campaign in April 1999 which raised nearly \$17.3 million by the end of January 2001. The building program financed by that campaign, and now underway, will enhance the Garden's mission in all areas: research, horticulture, conservation, education.

I am proud to say we have grown in service to our mission in the seven-and-a-half years while Carolyn has been at the helm, and we remain fiscally sound and debt-free. It has been a great ride, thank you, Carolyn.

And we are excited as we undertake the next leg of our journey. ☀



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## ON OUR COVER

A bee emerges from *Eschscholzia californica* (California poppy), perhaps next to visit *Penstemon parryi*. For more information about wildflowers and pollinators, read Liz Slauson's article on pages 8 and 9.

Photograph by Jennifer Johnston

Oops!

In the September 2000 issue of *The Sonoran Quarterly*, on page 7 in the first full paragraph, the correct spelling of the Latin name for Arizona cypress is *Cupressus arizonica*. The misprint was not the fault of the author.

In the December 2000 issue of *The Sonoran Quarterly*, on page 16 in the item "Expert Advice," the word "plants" was inadvertently omitted from Dr. Ted Anderson's quote which should have read that a visiting television crew "were truly interested in learning about cactus plants." Dr. Anderson, of all people, would never refer to the plural of cactus as anything other than "cacti" or "cactus plants." (See page 11.)



# Making the Desert Wildflower Trail: A Team Effort

By Elaine McGinn

In January of 1999, the Desert Botanical Garden received a generous donation from the Harriet K. Maxwell Foundation to create a trail dedicated to the beauty and appreciation of desert wildflowers and their pollinators.

This spectacular new trail, with official opening ceremonies on March 9, 10, and 11, features year-round wildflower displays from the deserts of North America. It includes boulder, desert floor, and shady habitats to present a brilliant display of desert wildflowers in their natural environs. Additionally, trailside exhibits illustrate the complex relationships between desert wildflowers and their pollinators.

The trail's thirty-one interpretive exhibits will be a new look for the Garden. Illustrated by world renown artist Paul Mirocha, the sign panels are vibrant in color and detail. The custom sign stands, designed by environmental designer Larry Kornegay, add a look of whimsy and reflect the theme of each garden along the trail. These enticing, educational exhibits have been tested and proven to attract and delight visitors of all ages.

The Garden used an innovative team approach to plan and install the trail. Teams were composed of staff—and, sometimes, volunteers—from the horticulture, collections, exhibits, education, research, and facilities departments. Outside architects, contractors, and consultants also worked with staff as needed. The composition of the teams varied according to the needs of each project, such as trail design, plant removal, construction, exhibit development, visitor evaluation, and exhibit fabrication. Wendy Hodgson, research botanist, developed the plant list for trail plantings; Michelle Rauscher, horticulturist, obtained the seed and created the wildflower beds; Ruth Greenhouse, director of the educational services department, completed the plant identifications and developed the educational messages for the trail; and Elaine McGinn was the project manager.

*Elaine McGinn is exhibits coordinator at the Desert Botanical Garden.*

## Harriet K. Maxwell

## Desert Wildflower Trail

This 1/3 mile trail features exhibits and hands-on activities about the wildflowers and pollinators of the North American Deserts

Ruth Greenhouse, director of educational services, and Liz Slauson, director of research, readied signs to be evaluated by volunteers and visitors.

### Bee Garden

Horticulturists created new beds for wildflowers.

### Hummingbird Garden

The Birte Endicott Shade Island is a place of respite and cool shade along the new Trail.

### Shade Garden

### Sonoran Desert Garden

The new Trail was inspired by former Trustee Brad Endicott and is named in his aunt Harriet K. Maxwell, whose foundation funded the project. The Trail opened last March and has been developing over the past year.

### Boulder Garden

### Binns Wildflower Pavilion

The Binns Wildflower Pavilion has already hosted weddings, receptions, parties, and many events. It is a gift of

### Night-Blooming Garden

You Are Here

To Garden Trails

To Gift Shop and Exit

A new entry road was contoured around the Garden. Horticulturists salvaged and replanted many plants from the new roadway.

Photos by Jennifer Johnston and Barbara Hofflander.



# Harriet K. Maxwell

Harriet K. Maxwell was born in 1903 in Rockville, Connecticut, a small town twenty miles northeast of Hartford, where her ancestors had lived since the early 1800s. She was the youngest child of Francis T. and Florence P. Maxwell.

As a young woman Mrs. Maxwell moved to California and established her home in Santa Barbara. She traveled extensively throughout the world and was an accomplished photographer and an avid golfer. She generously supported various charitable organizations in California, New England, and Arizona, particularly those involved in the care and protection of animals, culture, and early American history.

Late in her life Mrs. Maxwell moved to Carefree, Arizona, where she died in December 1996. She left no immediate family and is survived by a niece and two nephews. Her foundation is now directed by her trusted associates who are in the process of expending the funds in accordance with Mrs. Maxwell's wishes.

In January of 1999 the board of directors of the Harriet K. Maxwell Foundation made a grant of \$500,000 to build an exhibit of wildflowers from North American deserts at the Desert Botanical Garden, to be named in Mrs. Maxwell's memory. According to William W. Gaulty, president of the Foundation, "we think it is most fitting that Harriet's name will be forever associated with the Garden."

The Desert Botanical Garden is grateful to friends like Harriet Maxwell, and her nephew Brad Endicott, who have generously supported the *Growing a Legacy for Generations* capital development program. ♦

## Harriet K. Maxwell Desert Wildflower Trail Grand Opening Celebrations

### Friday through Sunday, March 9 - 11

The Garden will close at 3:30 p.m. on March 9th in preparation for the Members event that evening.

### Members-Only Open House

Friday, March 9, 5 to 8 p.m.

- 5 p.m. Ribbon Cutting Ceremony
- 7 p.m. Dedication Ceremony; keynote address by Trustee Martha Hunter
- Docent-led trail orientation tours
- Book signing by Wendy Hodgson, *Food Plants of the Sonoran Desert*
- Music by the Beth Lederman Jazz Trio
- Gift and Plant shops will have special wildflower items and plants for purchase.
- Cookies and prickly-pear iced tea will be served.

### General Public

Saturday & Sunday, March 10 & 11, 9 a.m. to 4 p.m.

- Docents will welcome visitors at the entry and along the trail, lead short tours, and staff an interactive touchcart.
- Children can participate in a mural activity and face painting in the pavilion.
- Botanical art by Tucson-artist Margaret Pope will be on exhibit and for purchase.
- Food, catered by Arcadia Farms, will be available for purchase.
- Gift and Plant shops will have special wildflower items and plants for purchase.

### Concerts:

Saturday, 11:30 a.m. to 1 p.m., Music in the Garden featuring Native American artists and 1999 Native American Music Awards best pop/rock recording artists Clan/destine, on Ullman Terrace.

Sunday, 11:30 a.m. to 1 p.m., Music in the Garden featuring the smooth sounds of jazz standards by the Blaise Lantana Trio, on Ullman Terrace.

Saturday and Sunday activities are included with Garden membership or admission.

### Special Saturday programs:

- Book signings from 11 a.m. to 2 p.m.:  
Judy Mielke, *Plants for Southwestern Landscapes*  
Sylvia Yoder, *Desert Hummingbird Gardens*
- Clinics: 20-minute presentations by Garden horticulturists and volunteers.  
10 a.m. - Blooming Cacti  
10:30 - "Botanizing" on Wildflower Hikes  
11 a.m. - How to Plant Wildflowers  
11:30 - Perennial Wildflowers  
noon - Creating a Children's Flower Garden  
12:30 - Flowering Trees and Shrubs  
1 p.m. - Hummingbird Gardens  
1:30 - Pressed Flower Crafts  
2 p.m. - Fragrant Flower Crafts  
2:30 - Butterfly Gardens  
3 p.m. - Creating a Rock Garden  
3:30 - Maintaining Wildflowers

- Presentations: Talks by local scientists, wildlife, and gardening organizations will continue throughout the day.

### Special Sunday programs:

- Book signings from 11 a.m. to 2 p.m.:  
Lynn Hassler Kaufman, *Birds of the American Southwest*  
Meg Quinn, *Wildflowers of the Desert Southwest*
- Clinics: 20-minute presentations by Garden horticulturists and volunteers.  
10 a.m. - Night-blooming Gardens  
10:30 - Seed Collecting  
11 a.m. - What's in a Name?  
11:30 - Edible Flowers  
noon - Urban Wildlife  
12:30 - Planting for Summer Color  
1 p.m. - How to Plant Wildflowers  
1:30 - How to Protect Wildflowers  
2 p.m. - Flowering Yuccas  
2:30 - What's in a Name?

- Presentations: Talks by local scientists, wildlife, and gardening organizations will continue throughout the day.

### PLUS

Festive giveaway for Garden members, and a chance to win a gorgeous pair of Tiffany & Co. earrings during our special wildflower-weekend.

# WHAT YOU CAN SEE in a wildflower

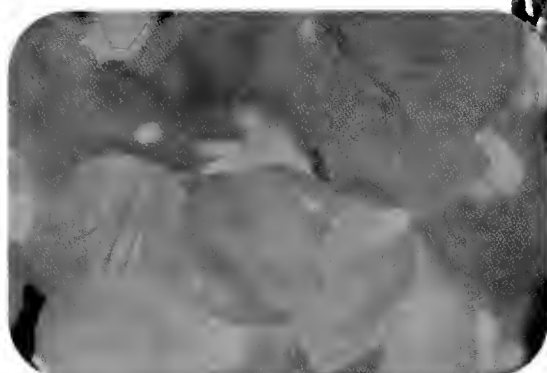
By Ruth Copeman

While we often say that the role of flowers is to attract pollinators, this dry statement makes it seem as if flowers wave a petal—like the green flag at a car race—and pollinators come running. This simplification couldn't be further from the truth! Flowers are more like a media blitz or an all-out campaign than passive advertisers.

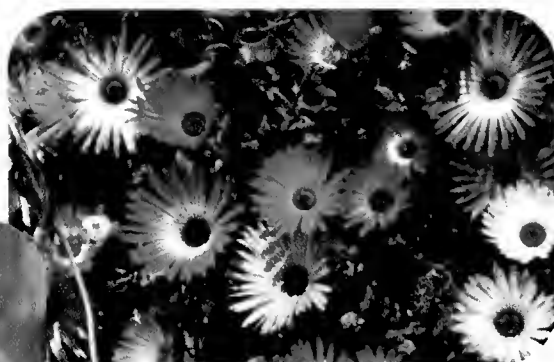
Here are a few of the ways flowers communicate with their target audience, the pollinators.

## Directions

There are many ways flowers can indicate which direction the pollinator should go to find nectar and be dusted with pollen at the same time. Here are two: runways, in which the stripes on these flowers of Arizona yellow bells lead a pollinator to the center of the flowers; and targets, in which the dark centers of these ice plant flowers act as bulls' eyes.



Arizona yellow bells (*Tecoma stans*)



Ice plant

## Announcements

Like streetlights, some flowers change colors to indicate that they are ready to be, or have already been, pollinated. Notice that the open flowers near the bottom of this aloe flower stalk are yellow-white. The closed flowers are not yet ready to be pollinated and are therefore red. This floral stop sign keeps insects from wasting time on flowers not yet ready for pollination. Other plants employing this system include some species of verbena and lupine.



*Aloe marlothii*

Desert Botanical Garden photo

## Disguise

In order to attract flies, this flower is in disguise—as a piece of rotten meat! Stapelia flowers look and smell like rotting meat, thus luring flies to visit. The fly pollinates the flower as it investigates the smelly treat, but does not benefit from the relationship. The fly lays its eggs on the flower, mistakenly thinking its offspring will be near a source of food.



Stapelia

## Baits and bribes

Most flowers which attract pollinators, like this penstemon, produce nectar. The flower's signals and announcements may lure the pollinator to the flower's "doorstep," but the sugary treat inside will keep them coming back for more. Some plants, such as penstemons, produce large amounts of nectar.



*Penstemon ssp.*

Photo by Jennifer Johnston

## Shape

Some flowers provide a convenient landing pad for their pollinators. An insect can land on the large lower petal of this salvia, move up into the flower and have a nectar treat while being dusted with pollen. Look for landing pads on yellow bells and desert willow, too.



*Salvia* var.  
'Peaches and Cream'

Photo by Jennifer Johnston

Ruth Copeman is coordinator of student services at the Desert Botanical Garden.

# New Potential Wildflowers from the Southwestern deserts

Text and photographs by Wendy Hodgson, M.S.

*Macrosiphonia brachysiphon.*  
*Peucephyllum schottii.*  
*Lagascea decipiens.*  
*Brickellia incana.*  
*Encelia resinifera.*  
*Encelia farinosa.*

Of those plants you may know only *Encelia farinosa*, brittlebush. Soon, however, we hope desert dwellers will come to know the others and additional attractive plants native to our North American deserts—the Sonoran, Chihuahuan, Mohave, and Great Basin/Painted.

These deserts support a vast array of flowering plants, but of the four, our own Sonoran Desert hosts the greatest number and variety of plants and plant communities. The Desert Botanical Garden seeks to help people understand and appreciate our deserts and all that they support. One way to achieve this is to acquaint people with plants from different desert areas. The Harriet K. Maxwell Desert Wildflower Trail is a perfect stage to showcase these relatively unknown, but beautiful, plants.

Early in designing the wildflower trail, Garden researchers compiled a fourteen-page list of North American desert plants and their habitats which might be re-created on the new trail. Staff collected seed from many of those plants, to be propagated and exhibited on the wildflower trail. The plants will be evaluated—and some promoted—for their horticultural promise of beauty and adaptability to our hot, dry climate.

Eventually people will become familiar with, and perhaps easily obtain, such shrubs as Fremont's smokebush (*Psoralea fremontii*), turpentine-broom (*Thamnosia montana*), rayless golden-head (*Acamptopappus sphaerocephalus*), or narrow-leaved turpentine-bush (*Ericameria linearifolia*).

Herbaceous perennials such as the fragrant heart's delight (*Abronia fragrans*), wild dwarf-morning-glory (*Evolvulus arizonicus*), yuca (*Merremia aurea*), climbing white-trumpet (*Merremia palmeri*), Arizona desert-foxglove (*Brachystigma wrightii*), or copper zephyr-lily (*Zephyranthes longifolia*) may become a part of

the landscaper's plant "palette." Other possibilities include coral gilia (*Gilia subnuda*), Utah firecracker (*Penstemon utahensis*), broad-beard



*Brachystigma wrightii*, native to the Sonoran Desert

beardtongue (*Penstemon angustifolius* var. *venosus*), heart-leaf suncup (*Camissonia arenaria*), or false-snapdragon vine, also known as roving-sailor (*Maurandella antirrhinoides*).

Annual wildflowers such as Abert's wild buckwheat (*Eriogonum abertianum*), California creamcups (*Platystemon californicus*), golden suncup (*Camissonia brevipes*), white-bract blazing-star (*Mentzelia involucrata*), Bigelow's desert-trumpet (*Linanthus bigelovii*), or yellow whispering-bells (*Emmenanthe penduliflora*) may become household plant names to desert plant aficionados.

Of those less familiar plants mentioned at the beginning of this article, *Macrosiphonia brachysiphon*, or Huachuca Mountain rock

*Penstemon angustifolius* var. *venosus*, native to the Painted Desert



*Macrosiphonia brachysiphon*, native to the Sonoran Desert

trumpet, is a Sonoran Desert herbaceous perennial that occurs from southern Arizona to central Sonora. From July to September it produces large, attractive, fragrant white flowers that attract hawkmoths and other night visitors, but close by mid-morning.

*Peucephyllum schottii*, or Schott's pygmy-cedar, is a dark green, fragrant, evergreen shrub that does indeed look and smell like a small cedar. It is, however, a member of the sunflower family, producing bright yellow flowers from March to June. These Sonoran and Mohave desert plants occur on the very dry, rocky slopes along the Colorado River, and in northeastern Baja California.

*Lagascea decipiens*, or doll's-head, is an attractive woody shrub, and like pygmy-cedar and the following species, is a member of the sunflower family. Its dense clusters of bright orange-yellow flowers are stunning. Within the Sonoran Desert this plant occurs in southern Arizona and Sonora.

Woolly white brickellbush, or *Brickellia incana*, is a particularly beautiful plant with its many stems cloaked with dense, white hairs and numerous pink flowers in dense heads. It is frequently found from the Sonoran Desert of southwestern Arizona to the Mohave Desert of southern Nevada.

Sticky brittlebush, or *Encelia resinifera*, is found in the Mohave Desert within the Grand Canyon and in the Painted Desert area within the Great Basin Desert. Its large, bright yellow flowers and dark green leaves rival those of its well-known relative, *E. farinosa*, or brittlebush.

As you walk along the Harriet K. Maxwell Desert Wildflower Trail, reintroduce yourself to familiar plants, and meet new ones. •

Wendy Hodgson is a research botanist at the Desert Botanical Garden and curator of the Earle Herbarium.

# POLLINATORS

By Liz Slauson, Ph.D.

Nestled along the new wildflower trail are four mini-gardens that feature plants with "pollination syndromes," suites of floral characteristics (such as floral color, size, shape, and nectar and pollen rewards) that attract certain pollinators. The four gardens highlight plants that attract bees, butterflies, hummingbirds, and nighttime pollinators, and include plants primarily from the Sonoran, Chihuahuan, and Mohave deserts.

## The bee garden

"Bee flowers" are generally blue, white, or yellow, often with stripes or other markings that reflect ultraviolet light, a wavelength of light which humans can't see, but bees can. These ultraviolet markings often serve as "nectar guides," marking the path to where nectar is hidden inside the flower (Palmer's penstemon, *Penstemon palmeri*, or desert willow, *Chilopsis linearis*). Although bees don't "see" the color red, they may visit red flowers that have ultraviolet markings.



Prickly-pear cactus flower with bee

Bees also like sweet odors and sugary nectar and can actually discern the degree of nectar sweetness. In fact, they require nectar with sugar concentrations greater than eighteen percent in order not to operate at a loss metabolically. Bee flowers therefore usually have nectar guides and nectar, although the nectar may be somewhat hidden. Pollen is an important source of protein for bees, and although it may not be present in large amounts

in some bee flowers (palo verde, *Cercidium* spp.), it is usually sticky and scented. Oil has recently been recognized as an important reward for bees. With an energy content twice that of sugar, oil is an important food for bee larvae (yellow orchid vine, *Mascagnia macroptera*).

Bee flowers are usually erect so that bees can land and forage easily (cacti flowers and many flowers in the Aster Family (Asteraceae) such as desert marigold, *Baileya multiradiata*). The floral odor is pleasant and often sweet-smelling. Flower shape can be regular or irregular (asymmetrical); irregular flowers are often tubular with a lip to aid in landing (penstemon, *Penstemon* spp.; white and blue sages, *Salvia* spp.; yellow bells or *Tecoma stans*).

## The butterfly garden

Featured in the butterfly garden are flowers that attract butterflies as well as plants that are important larval food sources for caterpillars. Butterfly flowers are open during the day and usually don't close at night, and are vividly colored, including reds and purples. Nectar guides or a groove in the floral tube (to guide the tongue or proboscis) are usually present, and nectar is ample, often well hidden in tubes or spurs. Flowers generally have a faint, but fresh odor. Often the blossom rim (or inflorescence, if composed of many small flowers) is erect and flat, and serves as a landing platform.

Look for butterflies on plants such as columbine (*Aquilegia chrysantha*), desert milkweed, (*Asclepias subulata*), Baja fairy duster (*Calliandra californica*), delphinium (*Delphinium scaposum*), lupine (*Lupine* spp.), verbena (*Glandularia*

*goodingii*), desert lavender (*Hyptis emoryi*), sage (*Salvia* spp.), and many plants in the Aster Family. Milkweeds (*Asclepias* spp.), desert senna (*Senna* spp.), and indigo bush (*Dalea frutescens*) are some larval food plants where caterpillars may be found.

## The hummingbird garden

Hummingbird flowers are also vividly colored, usually in reds, scarlets, and oranges. Unlike bees, hummingbirds have a visual sensitivity for red and are quite attracted to it.

Flowers are open during the day, tubular in shape, and may be pendant or hanging as hummingbirds are expert hoverers. The flower wall is generally hard with stiff or united filaments to help protect the flower from the hard bills of birds while they search for nectar inside the flower.

Hummingbirds are large and consume lots of nectar, so nectar is generally abundant though often deeply hidden. Floral tubes often have spurs, and are wider than those



*Oenothera caespitosa* with fly



Artwork by  
Paul Mirocha

in butterfly flowers. Century plants (*Agave* spp.), desert honeysuckle (*Anisacanthus thurberi*), columbine (*Aquilegia* spp.), Indian paintbrush (*Castilleja* spp.), delphinium (*Delphinium* spp.), ocotillo (*Fouquieria splendens*), galvezia (*Galvezia juncea*), chuparosa (*Justicia californica*), hummingbird trumpet (*Zauschneria californica*), and penstemon (*Penstemon* spp.) are some favorites of hummingbirds.

## The night-blooming garden

The night-blooming garden features flowers visited by moths and bats.

Moth flowers open around dusk and usually close during the daytime. Unlike butterfly flowers, they are fragrant with a strong, heavy perfume that is emitted at night. Flowers are usually white or faintly-colored, sometimes dull red or purple. Moths are quite active fliers with higher metabolisms than butterflies, and consequently nectar is more abundant in moth flowers. It is often deeply hidden in long floral tubes or spurs (some hawkmoths have proboscises four to six inches long!) which are narrower than bird blossoms. Like hummingbirds, hawkmoths are adept at hovering and don't necessarily need a landing platform. Blossoms may be horizontal or pendant, and rims (petals that form a landing platform) may be present, absent, or bent backward.

Visit this garden at night and enjoy the fragrance and light colors of moth flowers such as sand-verbena (*Abronia* spp.), angel's trumpet (*Acleisanthes longiflora*), datura (*Datura wrightii*), four o'clock (*Mirabilis* spp.), evening primrose (*Oenothera* spp.), Huachuca Mountain rock trumpet (*Macrosiphonia brachysiphon*), Easter lily cactus (*Echinopsis* sp.), queen of the night (*Peniocereus greggii*), hesperaloe (*Hesperaloe nocturna*), and yucca (*Yucca* spp.).

Although nectar-feeding bats are not native to the Phoenix area (they forage only as far north as Tucson), visitors have the opportunity in the night-blooming garden to view bat



Butterfly at marigold blossom

flowers. These flowers are usually open only at night, but here in the northern part of the Sonoran Desert where bat visitation can be unreliable, some bat flowers stay open during the day as well (such as Palmer agave, *Agave palmeri*, and saguaro, *Carnegiea gigantea*). Bats forage across large distances (twenty to sixty miles a night) and therefore have large metabolic needs. The flowers produce copious amounts of nectar (usually around twenty percent sugar) and pollen (the main source

Photographs by Jennifer Johnston

flowers can be "stinky," emitting a stale, fruity odor reminiscent of ripening or fermenting fruit. Another unusual characteristic of bat flowers is their unique position—they are usually presented outside of the foliage so that bats may easily hover and visit flowers. Bat-pollinated flowers besides Palmer agave and saguaro include cardon (*Pachycereus pringlei*), organ pipe cactus (*Stenocereus thurberi*), and other century plants (*Agave* spp.).

Although these gardens contain flowers with "pollination syndromes" that attract certain animals which reliably pollinate flowers, these syndromes are almost never mutually exclusive. A butterfly may visit a "bee flower" or a "hummingbird flower." Sometimes the visitor just "robs" nectar and pollen without performing pollination, while in other cases a wide



Easter lily (*Echinopsis thelegona*) with bee

of protein for nectar-feeding bats) at night, often near dusk. Flowers are usually drab in color, often whitish or creamy, sometimes with dull reds, purples, or greens.

Although both bat and moth flowers have a strong odor, the similarity ends there. Bat

variety of visitors may perform pollination (as in agaves). Watch for these exceptions to the rule (which are more common than you might think) when you visit the new wildflower trail. •

Liz Slauson is director of research at the Desert Botanical Garden.

# Special Conditions for Growing Wildflowers

by Michelle Rauscher

We all know that to plant a flowerbed, you go to the nursery and purchase a flat of flowers and all the soil amendments needed to enrich the soil for the new, delicate flowers to thrive. So, wouldn't it be the same for a wildflower exhibit? One would think that you could treat the exhibit like one large flowerbed—just haul in the mulch and fertilizer to enrich our nitrogen-poor desert soil. But wait! Hold the backhoe! These are desert flowers—they thrive in our native soil!

(Now, that's not to say that wildflowers don't appreciate an amended, rich soil. In fact, in most cases they love it, but they grow excessive, lush foliage at the expense of blooms.)

Though many of these flowers exhibited in our new wildflower exhibit do not grow naturally here in our Sonoran Desert, the conditions of their native habitats are similar: typically hot, sunny, and dry, receiving ten inches or less of rainfall a year with evaporation exceeding that. Because of this, these flowers can easily thrive here.

The flowers of each desert have evolved and grown in isolation, explaining why you see diversity between the deserts. We can, in most cases, grow a species from one desert successfully in another desert. Here at the Garden, for example, we accommodate flowers from the Chihuahuan Desert where they receive summer rains by providing extra moisture to those flowers during that time.

So, when we began this grand adventure of creating a new wildflower exhibit, we looked to Nature for our examples and researched the growing conditions of wildflowers in their habitat. In most cases, simply sowing the seed in our native soil



Penstemon in bloom

was all that was needed. How simple! It's no wonder that those of us who grow wildflowers have come to prefer their beauty and ease to the exotics.

There are some wildflowers that have special requirements. Different ones prefer moist soil, or sandy, well-drained soil, or even—like Indian Paintbrush—are semi-parasitic on grass roots. These, however, are exceptions to the rule. We are creating special habitats within the new wildflower exhibit for them.

To obliterate the old entrance drive which ran right through the new exhibit area, and because we wanted to create berms and mounds, we brought in large quantities of native soil—and whatever seeds it contained. As the seasons come and go, we will see not only the wildflowers that we have sown, but the mysteries of what seedbanks lay within our imported soils.

The basic requirements for beautiful wildflowers are there, however: native soil, protection from wildlife in the form of a fence and netting, an irrigation system to provide moisture for those nine out of the ten years when Nature does not provide enough rain, and the wonderful group we call hort-aides, who tend our desert jewels.

*Horticulturist Michelle Rauscher is in charge of wildflowers at the Desert Botanical Garden.*

## WISH LIST

If you have an item to donate on the Wish List, please call the Garden at 480/481-8194.

Desk, ell-shaped with arm extension

Dust Buster

Exacto knife

Golf pencils

Laptop computer Pentium III or IV

Laser printer

Metal soil/kitchen scoops

Microwave

Office chair with full back support

Paper cutter

Plastic dishpans

Pocketknife

Portable air compressor

Power Point projector system

Projector compatible with PC and Power Point

Slide projector

Slide reels (Kodak)

Tabletop copier

Water wands 36"

# What is the plural of "cactus"?

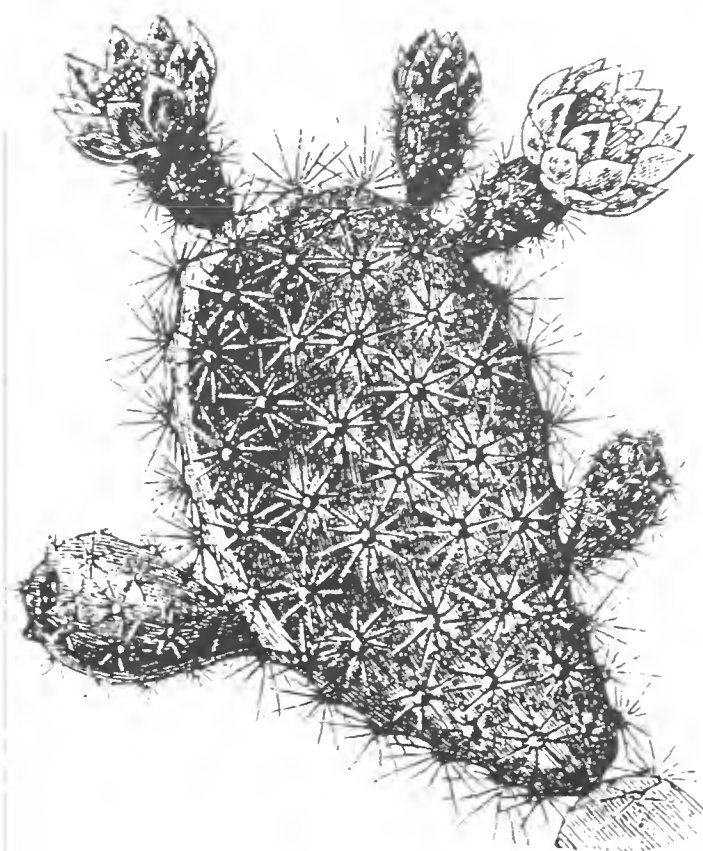
By Edward F. "Ted" Anderson, Ph.D., Senior Research Botanist

I have often been asked what the "correct" word is for the plural of "cactus." I always, and emphatically, say that I use the word "cacti." I also point out, however, that the dictionary states that either "cacti" or "cactuses" is acceptable. One can, in fact, be correct in using either term.

Recently the editors of the well-known magazine *Arizona Highways* decided, based upon a poll of the public, to again use "cacti" as the plural of cactus, having regressed a few years earlier to using "cactuses." I believe they made a wise decision. Having worked with cacti for more than forty years and having had a long association with scientists and cactus specialists throughout the world, I have often noted that these experts chuckle when some people—or publications—refer to these plants as "cactuses." Some

even perceive the use of this word as parochial—or at best uninformed.

What does one use as the plural for "fungus"? "Fungeses" or "fungi"? Indeed, it is the same Anglicization of a Latin word in both cases. If one examines the titles of books dealing with the cactus family, one sees the plural form "cacti" used almost universally. These books are written by people who are most familiar with the group, such as Lyman Benson, N.L. Britton and J.N. Rose, Arthur C. Gibson, Park S. Nobel, Charles Glass, Clive Innes, George Lindsay, Gordon Rowley, David Hunt, J. Borg, and Wilhelm Barthlott; all exclusively use the word "cacti." Long usage among well-educated people throughout the English-speaking world certainly supports the decision made by *Arizona Highways* to use "cacti."



Yes, one can use either "cacti" or "cactuses" as the plural of cactus, but I certainly prefer to use the term "cacti."

## THE BUILD-OUT is moving smoothly

After months of preparation of the infrastructure for the Garden's new buildings, above-ground construction began at the start of the new year.

"They began pouring the foundation and floor for the new gift shop on January 5th," said Kayla Kolar, the Garden's director of administration and planning, who is also lead project manager for the construction work. "Up until that time, we were doing all the infrastructure—the underground things like sewer, plumbing, electric, preparing the surface of the ground, and so on," she said.



Garden staffers take an early hard hat tour of the new improvements area. The project is moving faster than expected and does not affect visitors to the Garden in any substantial way.

Work has proceeded so smoothly that the completion schedule has been moved forward. The gift shop, plant shop, admissions area and courtyard, and service building are expected to be finished by this coming September, and everything else by December 2001.

Garden activities will continue unaffected throughout the building project, Kayla said. "Visitors may walk a little further to get into the Garden, but once there they will find our customary serenity or whirlwind of activities—whichever they're looking for."



# Rosettes and Gems: agaves in your landscape

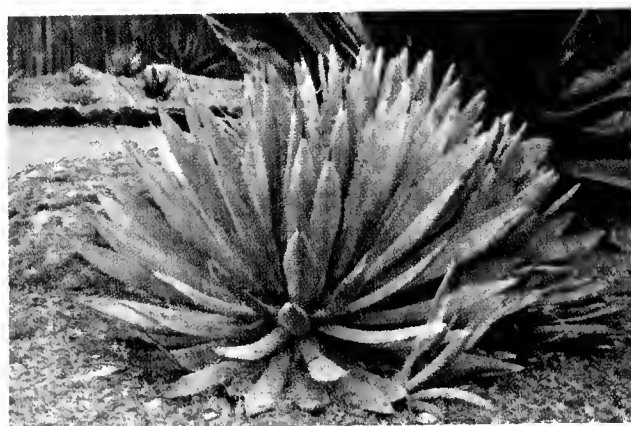
By Diane Barker

**A**gaves are a treasure in gardening. I love agaves in a landscape, and in my travels they are the first plants I look for. It is disappointing to find a desert landscape that does not include at least one or two.

I first saw agaves in habitat during a family camping trip to New Mexico in 1986. Between highway billboards advertising "The Thing!", I spied plants with beautiful, bright yellow flowers growing up the hill-sides on either side of the roadway. When we stopped to see "The Thing!", I asked about the plants. I was told that they were century plants, a common name given to the genus *Agave*. I was at the time a volunteer at the Desert Botanical Garden, and my first stop after vacation was the library where I discovered Dr. Howard Scott Gentry's book on agaves. And, as they say, the rest is history.

Agaves can be used many ways in the landscape. One of the most popular ways is as an accent plant, which is planted to bring out the beauty of adjacent plants. It could, for instance, be planted with wildflowers or desert shrubs such as *salvia*, *jojoba*, *brittlebush*. The many sizes of agaves and their shades of green enable them to blend or contrast with any plant. You can choose from blues, grays, yellowish-greens, light and dark greens. Most shades look great with the greens and grays of the desert.

Other ways to use agaves are as focal points and as specimen plants. In both cases the



*Agave macroacantha*, or black-spined agave, has elegant black teeth in contrast to its blue leaf color.

Photo by Michael Gardner



A naturally occurring hybrid between *Agave toumeyana* ssp. *bella* and *A. chrysantha*, *A. arizonica* is small and a good plant for containers.

Photo by Michael Gardner

agaves are placed in the landscape in a manner to draw the eye to that area. A focal point would be the most interesting and attractive area of a landscape, frequently enhanced by rocks and boulders, as well as yard art. A specimen plant is a single, special plant, sometimes an unusual species, that is placed in the landscape for its own beauty and uniqueness, a "wow" plant.

The characteristic rosette pattern of each plant is so symmetrical that it adapts to any space, as long as it doesn't outgrow the space during the plant's lifetime. Research what the plant's mature size will be before selecting a specimen for your landscape. Homeowners all too often purchase small agaves which grow too big for their space, leaving them no choice but to cut back the leaves and create the dreaded "pineapple agave," a look not meant for agaves. Placing the plants close to a sidewalk or pathway is another common mistake by landscapers and homeowners. As the plants grow, their terminal spines can be dangerous and therefore the homeowner clips the spines off, leaving the plant looking barbered. Agaves look far better when allowed to keep their spines and shed their bottom leaves naturally.

Theme gardens are great spots to use agaves. The agaves help to create many looks: formal, semi-tropical, casual, native, and, of course, desert. To select the right plant, look closely and consider the leaf shape, the leaf margins, the lateral teeth, and the terminal spine. *Agave aficionados* choose their plants because these features are so uniquely characteristic

of an individual species. An agave's leaves can be loose and floppy, helping to create a casual, carefree look, or they can be upright and rigid for a look which blends well with formal plants. Leaf margins can be smooth or heavily toothed or they can have filifera, which are threadlike structures along the leaf margins. Teeth and spines may be variously colored and of different lengths; they may be savagely sharp or soft.

Caring for agaves is easy and basic. In Arizona their natural elevations range from low deserts to pine forests. Most species growing in the lower desert benefit from filtered shade especially when they are immature. There is, however, a fine line between too much sun and too much shade. Too much sun will burn the leaves or cause them to turn yellow, and too much shade will cause the rosette to become loose and the leaves to grow misshapen and pale.

Agaves growing in the ground in the Phoenix area require water once a week during the summer months, and in the winter a monthly watering will be sufficient. They will grow with less water, but a weekly watering will considerably improve their appearance and



The leaves of *Agave murpheyi* have horizontal bands in blue-green shades and is a tidy, upright plant.

Photo by Michael Gardner

their health. No matter which season it is, agaves love rain. If they look wilted or parched, they quickly perk up and respond to any rain. In both the low desert and the high desert their regular watering schedule can be temporarily eliminated, depending on how much rainfall occurs.

Listed below are agaves which are beautiful



Photo by César Mazier

*Agave colorata* is a beautiful blue color with leaf margins heavily armed with dark teeth.

and also easily available at most local specialty nurseries or at the Desert Botanical Garden's fall and spring plant sales. Any of these would be jewels in the landscape. The number of agaves available for purchase is limited but growing, and since there are at least two hundred known species, check with your local desert nursery to see what may be newly available.



Photo by Michael Gardner

*Agave parryi* has widely varying leaf shape within the species. Some plants have longer leaves, others have wider leaves.

#### *Agave macroacantha*

Small in size, at maturity approximately eighteen inches high, *Agave macroacantha* will grow into a large-diameter clump if allowed. Keep it at a manageable size by removing new pups (sprouts) as they emerge from the ground. This agave looks attractive in a dish garden or a pot on the patio. Leaves are blue-gray in color with black terminal spines and side teeth. The species is native to the Mexican state of Puebla.

#### *Agave arizonica*

This is a naturally occurring hybrid between *Agave chrysantha* and *Agave toumeyana* ssp. *bella*. It is about eighteen inches tall when mature. The leaves are dark green with a slender terminal spine and a reddish-brown margin. The form can vary greatly from plant to plant with individuals more strongly resembling one parent or the other. It is also a good container plant but looks best as a single specimen whether in the ground or in a pot. This one also is an Arizona native.

#### *Agave victoriae reginae*

This popular agave is native to the Chihuahuan Desert. Its size, color, and markings make it an attractive plant for your landscape. It grows to a height of eighteen inches, allowing for it to be used in containers and small spaces in the

landscape. The leaves are dark green with white bud print markings, and the plant rosette is a tight ball of numerous firm, upright leaves. The terminal spines are black and on some plants they are recessed in a cottony pocket. Although there is much variability within this species, all plants are extremely appealing.

#### *Agave schidigera*

Bud-printed leaves—the outer side of each leaf has the imprint of the leaf which enfolded it—is characteristic of most agaves, but on *Agave schidigera* this trait is exceptionally visible and attractive. The bud print is white and adds to the beauty of this species. Another attractive feature of the dark green leaf is its white, thread-like margin known as filifera. This plant is great as a focal point or in contrast to large-leaved or solid-leaf herbaceous shrubs. About two to three feet tall when fully mature, *A. schidigera* occurs natively in Mexico.

#### *Agave parryi*

Native to Arizona, this agave is popular for use in the landscape as well as containers. It is available in many varieties which differ in leaf shape and color. Similar to *Agave macroacantha*, it has wide leaves and a fuller rosette. With extra water this species can grow to three feet in diameter and height, but take care that the water does not cause rot in the root zone.

#### *Agave murpheyi*

This species averages three feet tall and can be used in the landscape both as a specimen plant and as a focal point. An Arizona native, it was used by Native Americans for food and fiber. It is blue-gray with distinctive horizontal markings on the leaves.

#### *Agave colorata*

A medium-sized gray agave, this species is one of the best examples of bud printing on the leaves, which makes *Agave colorata* a popular choice for landscapes. The gray color blends well with the pale greens of other desert plants. The leaves are spatulate (wider in the middle), creating a looser rosette. They have irregularly shaped teeth on their margin and interesting terminal spines. *A. colorata* is small to medium-sized, to two-and-a-half or three feet.



Photo by Diane Barker

One of the most popular agave species used in landscapes, *Agave victoriae reginae* has distinctive white filifera and bud-printing, a characteristic of all agaves.



Photo by Michael Gardner

*Agave weberi* is dramatic and large, a perfect specimen plant.

#### *Agave vilmorinianna*

Light green or yellow-green, floppy leaves give this agave its common name, "octopus agave." The leaves are soft and pliable, smooth edged and lacking dangerous terminal spines. Growth varies from plant to plant, which may achieve two to four feet tall and three to five feet wide. The flower stalk is extremely beautiful, a tall spike covered with bright yellow flowers. After the flowers bloom they are replaced on the stalk with small plants called bulbils, which are easily propagated by placing them in sand and keeping them moist. You can grow plenty for yourself and still have many plants to give to friends.

#### *Agave weberi*

Demanding a prominent spot in the landscape, this species is very large, reaching five to six feet in height and at least six feet in width. Its blue-gray or green color mixes beautifully with all herbaceous plants. The leaves are long and semi-undulating, forming a graceful, majestic appearance. Marginal teeth are either minute or nonexistent. *Agave weberi* is a real agave-lover's delight.

#### *Agave americana*

One of the largest agaves available, *Agave americana* can reach seven feet in height at maturity. Leave plenty of space for this plant to grow and it will be a glorious addition to the landscape. It brings a formal look with its blue-gray leaves which are tall and upright. The main plant will produce many small pups; it is best to remove the pups soon after they emerge for the best control of the plant.

So many to choose from and so little room in the landscape! My suggestion is to become familiar with these and other species within the genus *Agave* and find the ones that appeal to your own taste. The possibilities are beautiful and endless. Have fun in your search but watch out for the terminal spines! •

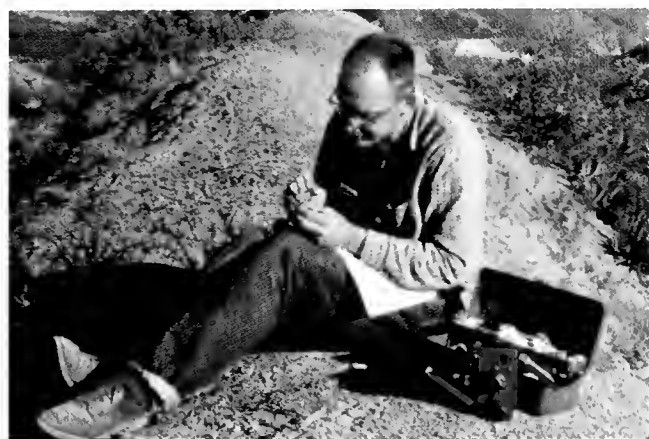
Diane Barker is the Garden horticulturist in charge of growing agaves.

# To Write a Book

By Edward F. "Ted" Anderson, Ph.D.

**S**ome have suggested that my writing a major book on cacti is a form of insanity. At times during the long process I even thought so myself. The need, however, for a modern, scientifically-based, comprehensive book on the cactus family was critical, for no scientist has attempted the task in the past seventy-five years. Many books on cacti have been written in recent years, but none has dealt with all of the currently accepted genera and species and, as well, presented introductory material on the characters of the family, its use by humans, and conservation concerns. This is the task that I undertook five years ago.

There has been a great need for a modern treatment of the cacti, for many new species have been discovered and much research done. Recent research using DNA sequencing, for example, has resulted in several new conclusions about the classification of cacti. Many studies have been published on various groups, but other groups have been largely ignored and are poorly understood.



Studying *Ariocarpus scaphirostris* in its habitat in Mexico, January 1961.

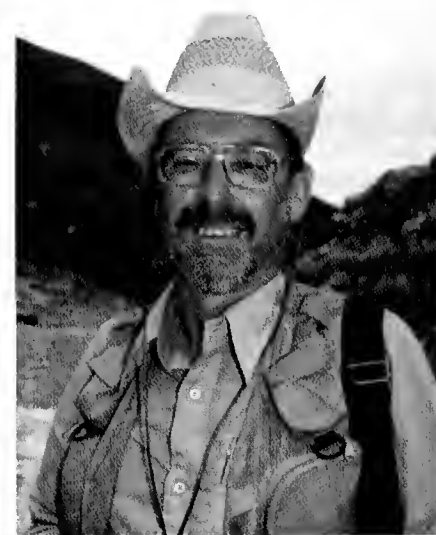
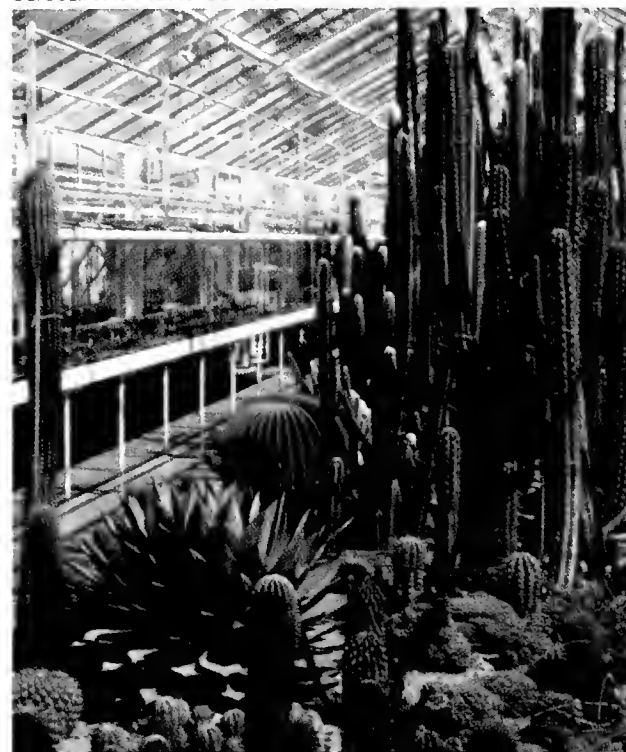
When I was hired by Dr. Robert Breunig and came to the Desert Botanical Garden in 1992, I agreed to write a major book on cacti, but I was not sure what form it would take. That was decided when the scientific editor at Timber Press in Portland, Oregon, asked me to write a comprehensive book on the family. To have a publisher before one even begins writing a book is the dream of all writers! I felt this was an opportunity not to be passed up: creating a major book on cacti while working at an institution with one of the greatest cactus collections in the world.

Fortunately I have had much experience in the field studying cacti in both North and South America, and I know many specialists who also study cacti. These colleagues have been helpful and supportive.

The organization and writing of the book began in earnest in 1995 as I began to put together materials, photographs, and information which I had accumulated over more than forty years. I was also fortunate to have the collaboration and advice of colleagues in the IOS (International Organization for Succulent Plant Study) and the efforts of the IOS Cactaceae Working Party, a group which has worked since 1984 on developing a modern classification of cacti and of which I have been a member since its inception. This group of scientists and dedicated amateurs, now called the International Cactaceae Systematics Group, continues to meet annually to discuss matters dealing with the classification of cacti, and their conclusions are strongly reflected in my book.

Several publications have already resulted from the group's efforts, including the treatment of the cactus family in the *Garden Flora of Europe* and in Kubitski's *The Families and Genera of Vascular Plants*. For my work, however, the most important publication using the Working Group's classification has been the publication compiled by David Hunt called the *CITES Cactaceae Checklist*. Using the

Part of the cactus collection at the City of Zürich Succulent Plant Collection in Switzerland.



During fieldwork in Mexico on a project financed by World Wildlife Fund, June 1986.

well-compiled material in Dr. Hunt's publication, as well as many works in the Desert Botanical Garden's library, I began to write.

The publisher agreed to include many color photographs of the cacti, so I also set about taking photos of cacti not already in my slide collection. This required further fieldwork in both Mexico and South America, though I obtained many photographs simply by going into the Garden daily during the spring months, camera in hand. My research also took me to other botanic gardens such as The Huntington in California, as well as several European collections and gardens. The collections in Berlin, London, Monaco, and Zürich were particularly valuable. Additionally, I asked colleagues to contribute photos, and they willingly did so. When all the photos were assembled I discovered that I had more than one thousand! Happily, the publisher agreed to include all of them, so the book not only has descriptions of all accepted species, but also photos of many of them. It contains at least one photograph of each of the 125 accepted genera.

The publisher also wanted to include a chapter on cactus cultivation, a subject beyond my expertise. Dr. Roger Brown agreed to write this portion, which adds greatly to the value of the book.

The book, titled *The Cactus Family*, has five introductory chapters and then deals with the 125 genera and 1,810 species. Each genus is introduced by a few paragraphs on its history, the source of the name, and its distribution. This is followed by descriptions of all currently accepted species, subspecies, and varieties within that genus. There are also indices of scientific and common names at the end of the book, as well as a brief glossary, maps, and an extensive list of literature cited.

I particularly appreciate the support which



Reviews by Jennifer Orf

**Penstemons** by Robert Nold

307 pp. Portland, Oregon: Timber Press, 1999, \$29.95

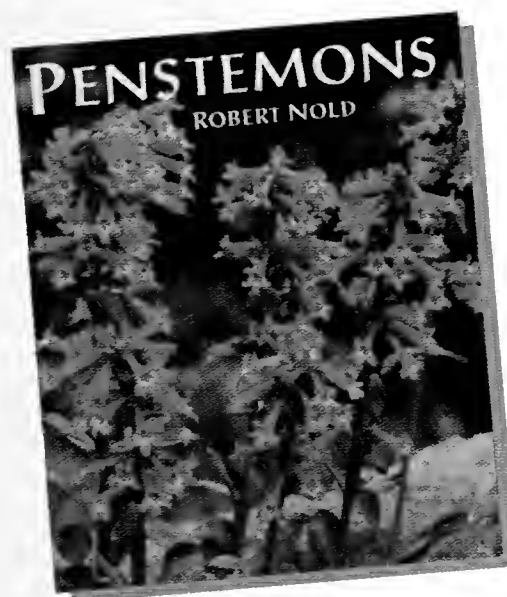
**The Gardener's Guide to Growing Salvias** by John Sutton

160 pp. Portland, Oregon: Timber Press, 1999, \$29.95

One of the most enjoyable tasks of my job here at the Desert Botanical Garden is searching for and acquiring new books for the library. Being one part book lover and one part plant lover, I am delighted to indulge both interests in the quest for new botanical literature. I am also always happy to receive recommendations.

With spring underway and our new wild-flower trail about to open, I decided that *Penstemons* by Robert Nold and *The Gardener's Guide to Growing Salvias* by John Sutton were must-haves for the Richter Library.

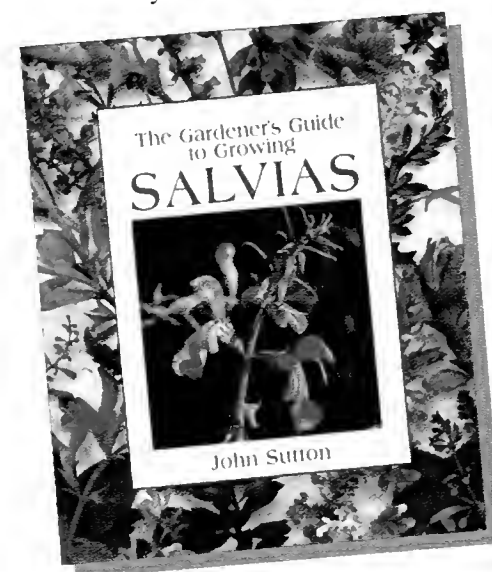
Robert Nold's book is one of the few in print devoted solely to the subject of penstemons. Mr. Nold is an ardent rock gardener who resides in Colorado where he maintains a garden with a collection of more than two hundred species of penstemons.



This book is a thorough examination of the penstemon, discussing everything from the morphology and pollination of the plant to detailed species descriptions. My favorite chapter, however, was the one entitled "Cultivation." In a charmingly honest manner, Mr. Nold states, "There is really no one correct way to grow penstemons (or, I think, any other garden plant), and I am wary (and weary) of books suggesting that a certain way is correct and all others are wrong."

Although the book contains only fifty-five color photographs, it showcases twelve beautiful botanical illustrations by Cindy

Nelson-Nold. It also includes a month-by-month gardener's calendar, a watering schedule, and an index of selected penstemons by color.



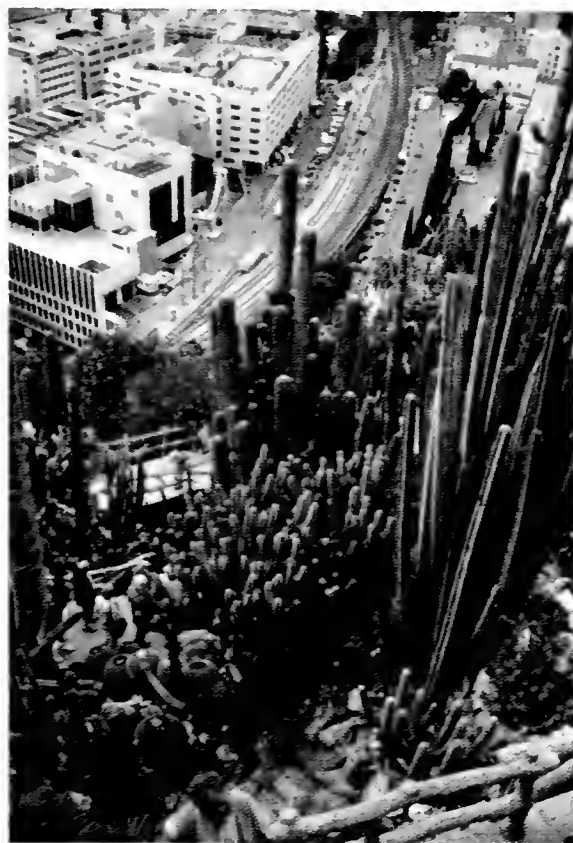
*The Gardener's Guide to Growing Salvias* by John Sutton is a terrific companion to Betty Clebsch's *A Book of Salvias*. In fact, she is included in this book in a section she wrote specifically about salvias in North America. Originally published in the United Kingdom, this book was then released by Timber Press in the United States.

Full of spectacular color photographs, the book gives detailed information about ninety species and cultivars of hardy, half-hardy, and tender salvias. A wonderfully detailed chapter about the botany of salvias is accompanied by several line drawings.

Two chapters are devoted to the history of salvias. Beginning with a discussion of the use of the foliage in ancient Greece and Rome as a compress in the treatment of wounds, the history of the genus continues to the present status of salvias as a garden plant in the Royal Botanic Gardens, Kew.

Author Sutton provides a thoroughly detailed description of each plant included in this volume as well as quite specific cultivation information. The book also lists where to buy and see salvias in the United States and worldwide. •

Jennifer Orf is librarian and curator of the library collection at the Desert Botanical Garden.



Jardin Exotique of Monaco, one of the best cactus collections in Europe.

the staff of the Desert Botanical Garden gave me during this long effort. Patrick Quirk was especially helpful as were Jane Cole, Dianne Bean, and Jennifer Orf.

The book is not the final word in cactus classification, for studies of this remarkable group will continue, with new information and new interpretations. I hope the book will be, however, a lasting contribution to the field of biology, a significant step on our path to better understanding the cacti. It will definitely be a demonstration of the importance of the Desert Botanical Garden as an institution supporting its scientists in their search for knowledge of the cacti and other desert plants.

*Dr. Anderson is senior research botanist at the Desert Botanical Garden. His book of 778 pages contains about one thousand color photographs, and is priced at \$99.95. Published by Timber Press, it is available this spring in the Garden Gift Shop.*

*Dr. Anderson is past president of the International Organization for Succulent Plant Study, a fellow of the Cactus and Succulent Society of America, and a member of the Linnean Society, London. In 1998 he was awarded the prestigious Cactus d'Or, given by the principality of Monaco for outstanding research on succulents. His publications include Peyote: The Divine Cactus and Plants and People of the Golden Triangle (both published by Timber Press), and Threatened Cacti of Mexico (published by Royal Botanic Gardens, Kew).*



## When Kirti talks, we listen!

Have you ever wondered how your landscape attracts birds, bees, and butterfly friends? Kirti Mathura, Garden horticulturist, will demonstrate the whats and hows of creating a desert oasis for wildlife in your own backyard on Wednesday, March 7, from 10 to 11:30 a.m. at the Robb & Stucky

store, 15440 N. Scottsdale Road in Scottsdale.

Kirti's presentation, "Landscaping for Wildlife," will include a slide show, question-and-answer session, and samples of the varieties of plants that work best.

## Lizard tour

As temperatures rise in the spring, lizards abound in the Garden. They warm in the sun and chase along the trails. They display their brilliant mating colors and do their "push-ups."

Come to the "Looking for Lizards" Tour on Saturday, May 12 at 9 a.m. to find out more about the lives of lizards and the many kinds we see in the Garden.

## Buying online now benefits the Garden

The Garden is now an Amazon.com Associate. This means the Garden receives a percentage of everything you buy from Amazon.com if you use the link to Amazon provided on our website [www.dbg.org](http://www.dbg.org).

All you have to do is visit our website and click on "Book Recommendations." From here you can either click on the book you want to buy, in which case Amazon will pay us fifteen percent, or click on the Amazon.com link and shop at their store, in which case they will pay us five percent of everything you buy, including CDs, videos, DVDs, toys, consumer electronics, and more. Either way, you'll get Amazon's famous service while benefiting the Garden.



## Paint the Desert!

A new feature this year at Dinner on the Desert will be canvases painted by well-known local artists, such as this one by Wilde-Meyer Gallery artist Brian Cook. The canvases will be auctioned, offering buyers a chance to purchase an unusual piece by a known artist.

The 15th annual Dinner on the Desert, the Garden's spring fundraiser, will be held Saturday, April 28th. Forty well-known artists are generously painting flora- and fauna-themed canvases to be offered in the popular plant specimen auction. Guests will enjoy the evening's magical ambience during a decadent dinner followed by dancing. Proceeds from the tickets, beginning at \$250 per person, help the Garden fulfill its mission of research, conservation and education. Reservations fill up quickly. Please call Julie Thikoll for information, 480/481-8147.



Specimen plants in beautiful containers are a highlight of the plant auction at the annual Dinner on the Desert. This pot was handmade by Michael Prepsky.

## Garden Group Activities

If you're looking for an interesting activity for your group's next event, consider a day at the Garden!

Special self- and docent-guided tours, as well as seasonal and specialty tours, are available year-round for groups of ten or more. No matter how large your group, or how varied their interests may be, the Garden's charming ambiance is the perfect venue for your special outing.

Call group services at 480/481-8104 for information on how to book your group's next outing.

## Hot Off The Press!!!

Wendy and Ted to sign copies of their new books

Wendy Hodgson, M.S., and Edward F. "Ted" Anderson, Ph.D., will sign copies of their newly published books at coming Garden events.

Wendy will sign *Food Plants of the Sonoran Desert* from 5 to 7 p.m., Friday, March 9, at the members-only event which officially opens the new Harriet K. Maxwell Desert Wildflower Trail.

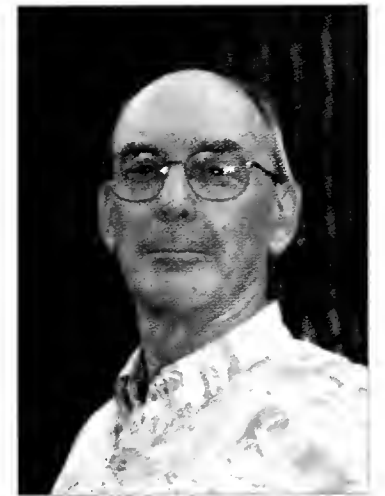


Wendy Hodgson, M.S.

She will also sign copies of the book at the Garden's Spring Plant Sale

Festival on members' day, March 23, from 10 a.m. to 1 p.m.

Ted will present a short talk and sign his new book, *The Cactus Family*, from 5 to 7 p.m. on Monday, April 2, in Webster Auditorium.



Edward F. "Ted" Anderson, Ph.D.

Copies of both books will be available for purchase at the book signings and in the Garden Gift Shop as well.

Plan to attend, meet the authors, and get them to sign your first edition!

## Sammy Saguaro in cyberspace!

In July 2000 the Garden launched a new internet activity called "Sammy Saguaro's Scrapbook." With state-of-the-art animation and interactive components, this entertaining site helps people of all ages learn about the saguaro's adaptations, natural history, and interactions with desert wildlife.

The site was co-developed by the educational services department and Jonathan Mann, an instructional designer for Intel, who donated his services while on sabbatical leave. Jonathan, a longtime member of the Garden, has used his creative educational talents in other

Garden projects over the years, including a multimedia ethnobotany curriculum and the Desert House indoor exhibits.

Highlights of the Sammy Saguaro internet site include:

- Watching a saguaro grow from seed to a tall cactus;
- Peeking into a woodpecker's nest deep inside a saguaro cactus;
- Seeing the saguaro expand in response to rain and contract when it's dry.

Check out this site which is easily found on the Garden's website [www.dbg.org](http://www.dbg.org).



Photo by Jennifer Johnston

Enjoying the holiday reunion with Saguaro Society members at a dinner in Desert House during *Luminaria* 2000 are (from left) former Trustee Connie Binns; Kate Bakkum, Garden development associate; Betty Bool, Saguaro Society member and longtime Garden supporter, and Beverly Duzik, Garden director of development.

The Desert Botanical Garden is grateful for the support of all 9,090 members. Recognized here are members of the President's Club, Director's Circle, Curator's Circle, Saguaro Society, and The Sonoran Circle. Also listed are donations and memberships received from October 1 to December 31, 2000, for Ocotillo Club, Boojum Club, Agave Century Club, and Desert Council.

## PRESIDENT'S CLUB

Jacquie & Bennett Dorrance  
Dorothea & Bradford Endicott  
Hazel Hare  
Edith & William Huizingh  
Barbara & Donald Ottosen

## DIRECTOR'S CIRCLE

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Marie Doepper  
Leigh & David Hann  
Naomi & Denison Kitchel  
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## Spring Music in the Garden Concert Series

Sundays, March 4 through 18

11:30 a.m. to 1 p.m.

Food and beverages available from Arcadia Farms Patio Café

## Grand Opening: Harriet K. Maxwell Desert Wildflower Trail

Members' preview: Friday, March 9, 5 to 8 p.m.  
Public tours: Saturday & Sunday, March 10 & 11, 9 a.m. to 4 p.m.

## Garden Tour

For members of the Saguaro Society, Curator's Circle, Director's Circle, and President's Club  
Sunday, March 18, 11 a.m.

## Spring Plant Sale Festival

Members' preview: Friday, March 23, 9 a.m. to 6 p.m. & Saturday, March 24, 8 to 9 a.m.  
Open to the public: Saturday & Sunday, March 24 & 25, 9 a.m. to 5 p.m.

## Jazz in the Garden Concert Series

Fridays, April 6 through June 29, 7 to 9 p.m.  
(No concert on April 27)

Food available from Arcadia Farms Patio Café

## Dinner on the Desert

Saturday, April 28, 6:30 p.m.

Garden closes at 3 p.m. for this event

## Boyce Thompson Arboretum Field Trip

For members of the Saguaro Society, Curator's Circle, Director's Circle, and President's Club  
Saturday, May 12

## Annual Garden Members' Meeting

Thursday, May 24

Reception at 4 p.m.; meeting at 5 p.m.

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Ruth & James Lorge  
McCormick Ranch Flowers  
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Mulberry Street Neighborhood Bar and Grill  
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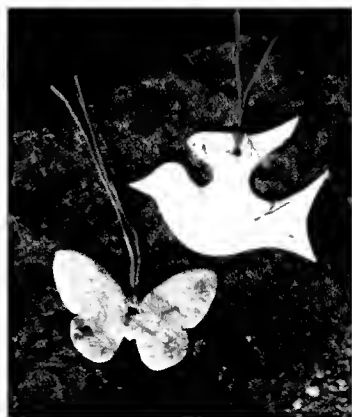
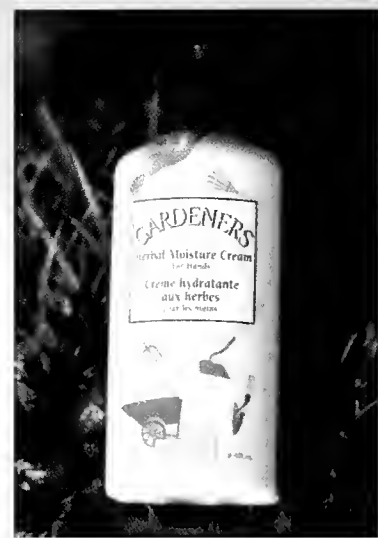
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Blue corn is the distinctively Southwestern ingredient used in this original cookie. When combined with pecans the result is an exceptional short-bread cookie with a delicate, nutty flavor.  
\$5.25 (7 OZ.)



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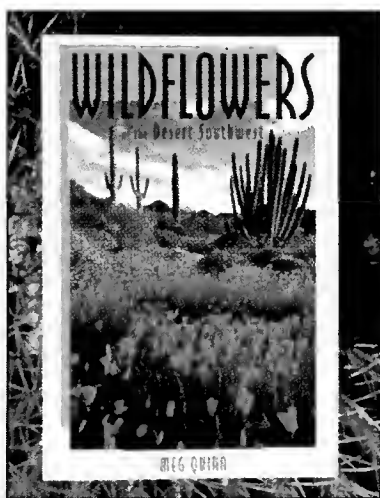
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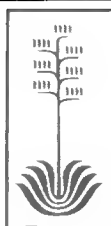


## Wildflowers of the Desert Southwest

*Wildflowers of the Desert Southwest*  
by Meg Quinn  
88 pages, softcover,  
86 color photographs \$9.95

Meg Quinn helps even the most amateur botanist identify more than eighty-five of the most common and showy species. Each is described in detail and depicted in full-color photographs in its natural habitat. Species are further organized by color for ease of identification.

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# SONORAN QUARTERLY

"The breath of  
flowers is far  
sweeter in the air  
than in the hand"

Francis Bacon

Annual Report Inside



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## THE SONORAN QUARTERLY

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# From behind the desk, a different view

By Dr. William Huizingh  
Interim Executive Director

**D**uring the several years of my association with the Garden, I have learned that many of our visitors have little, if any, grasp of the range of activities that take place here or of the size of staff required to "make it happen." Indeed, some individuals even assumed that the Garden has no employees and that everyone here is on a volunteer basis.

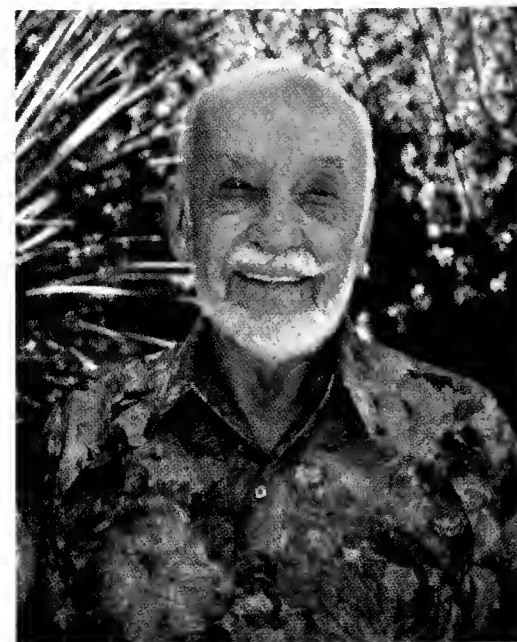
Those who have served on the board of trustees and/or on board committees have learned something of the Garden's organization and of the complexity of activities that take place. But even board members, since each tends to focus on one or two functions, have a somewhat limited comprehension of the "big picture." Similarly, volunteers usually provide services in a specific area and thereby develop an in-depth understanding of only one activity.

It is worthwhile to review the wide range of activities that, taken together, assure that the Garden will attain the goals of its mission statement in an effective and efficient manner, and to relate those goals to the Garden's organizational structure.

As set forth in the Garden's Articles of Incorporation, dated 1937, the purpose of the Garden is "to exhibit, to conserve, to study, and to disseminate knowledge of arid-land plants of the world, with special emphasis on succulents and the native flora of the Southwestern United States."

The task of exhibiting is a multifaceted effort directly involving the departments of horticulture, collections, educational services, and research. The dissemination of knowledge also involves all of those departments, as well as community relations and the library. The study of plants occurs principally in research, collections, and horticulture departments. All units are strongly committed to conservation efforts.

Making major contributions to visitor enjoyment of the Garden are facilities and rangers, who provide accessibility, comfort, and safety.



Dr. William Huizingh

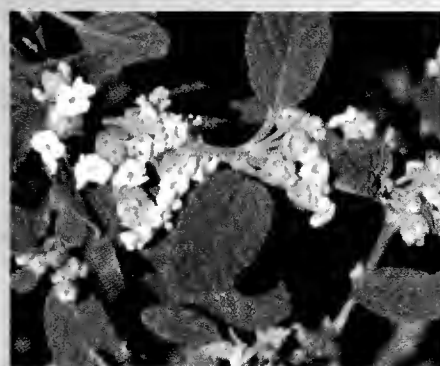
None of these services would be possible were it not for those groups involved in providing monetary resources. One thinks first of admissions, development and membership, the gift shop, and the plant shop. But many of the units mentioned earlier also contribute to financial stability by offering special courses, programs, and events. The business and executive offices contribute to the Garden's mission by providing information, leadership, and coordination of the entire organization.

Additionally, of paramount importance are the services provided by Volunteers in the Garden. These activities are so ubiquitous as to defy detailed description. Virtually every function within the Garden benefits from the devotion and talents of the volunteers.

During the four months or so that I have served as interim executive director, several times I have been asked whether my perception of the Garden has changed because of viewing it from a different perspective. The answer is an emphatic "yes."

Although I have long recognized that the Garden is blessed with an extraordinarily committed and accomplished group of individuals among its staff and volunteers (as well as its board), I am now more aware of the truly exceptional pool of talent available to attain our goals. I have witnessed situations in which individuals have quickly gained new knowledge so as to perform an essential service not otherwise available. Above all, I have been gratified to observe the cooperative efforts to accomplish challenging goals.

More than ever before I am convinced that all things are possible through teamwork. I am honored to have served the Garden in company with such a dedicated group of individuals. ☀



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## ANNUAL REPORT

Annual Report for the year 2000      Center pull-out

## ON OUR COVER

Desert marigolds (*Baileya multiradiata*) nearly stole the show, along with Goodding's verbena (*Verbena gooddingii*), yucca (*Yucca baccata*), and brittlebush (*Encelia farinosa*) along the Harriet K. Maxwell Desert Wildflower Trail where flowers from North America's deserts will bloom in a seasonal tapestry throughout the year.

Photograph by Jennifer Johnston





# Spring bloom and

By Michelle Rauscher

Photographs by Jennifer Johnston

The blooming season this spring was long and lush. The amazing flowers that lured city dwellers out-of-doors to look at Arizona parks, roadways, and natural areas set their seed in February, March, April, and even May. That seed—dropped or thrust to the ground, perhaps moved slightly by wind and water—replenishes the natural seed bank which holds

and wet winter rain season carries the promise of color, and that at least one inch of rainfall during the “window” of late September into early December is needed for most seeds to germinate. The earlier the rainfall occurs during this window, the better the chances are for the showy species to germinate. For a year to qualify as spectacular, the inch of rain must be followed by at least five inches of well-spaced rains. If seven or more inches fall, the displays will be dramatically enhanced.

No two years are the same. The seeds of different species have different requirements for germination. It is the combination of temperature, rainfall, and other conditions that determines which species will be dominant in any particular year. One year you may see only a monoculture of a single species blooming in a given area, the next year you may see in that same location an assortment of flowers in almost equal abundance.

But even when all the necessary conditions are present, there is still no guarantee of a noteworthy display. Many factors can prevent a good bloom. Weather conditions such as unseasonably warm winter temperatures or hot winds can cause drought stress that may result in premature flowering. A cold winter can stunt the

Baja fairyduster seeds (*Calliandra californica*)

seedlings' growth; thick vegetation from a wet summer could blanket the ground and prevent germination; or unusually high populations of rodents, rabbits, quail, or insects may eat the seedlings once they have germinated.

Not only do the seedlings provide good meals for wildlife, but the seed bank itself can be slowly depleted as it provides an important and nutritious food source for seedeaters such as harvester ants, kangaroo rats, and birds. After a bountiful spring there may be as many as 200,000 seeds per square meter (square yard) of soil; but even after several dry years without seed production and deposits into the seed bank there still will remain several thousand seeds per square meter.

It is essential that the seeds have the capability of remaining dormant for many years. Seeds



Aloe seeds

the desert's future vegetation. A spectacular blooming season like the one we just enjoyed comes along on the average of once every seven to ten years, and until the conditions are just right the seeds of these jewels will lie dormant in crevices and on the surface of Earth's soil.

Try as they might, desert dwellers and botanists are unable to predict when the next spectacular bloom event will occur. What makes the task of predicting nearly impossible is that there are many interacting variables which must be just exactly right; and, in addition we do not precisely know what many of the required conditions actually are.

What we do know is that an unusually early

*Pelargonium* seeds



# Nature's seed bank

are the great drought-escapers, and will not germinate unless there is abundant moisture. One way this is accomplished is by inhibitors in the seed coats of some species which must be leached out with ample moisture before the seeds can germinate.

Another important strategy is that all of the seeds of any given species do not germinate at the same environmental signal, such as one rainfall. This is Nature's self-insurance, a way



Gila sophora seeds (*Sophora formosa*)

of not "putting all the eggs in one basket." If seedlings emerge over several weeks each year and over the course of several years in general, a wildflower population can avoid extinction caused by one catastrophic event such as an unseasonable weather extreme or an insect epidemic.

Once the seed of an annual germinates and the plant embarks on its life's journey, there



Baja fairyduster seeds & flowers  
(*Calliandra californica*)

is no turning back. The next generation depends on the success of the plant's brief existence. It may reach a height of two to three feet during a wet year, or may be forced during a dry year to flower and set seed when only a couple inches tall. When the goal of making seeds—replenishing the seed bank—is met, the ephemeral dies. We wildflower enthusiasts can only sit back and wait for the exquisite mysteries of the seed bank to spring forth once again in yet another unique tapestry of color.

*Michelle Rauscher is a horticulturist at the Desert Botanical Garden.*



Blue palo verde seeds

## Ken Schutz named to be Garden's tenth director

The Desert Botanical Garden Board of Trustees has hired Kenneth J. Schutz as the Garden's tenth executive director. He assumes those duties on June 4.



Ken Schutz

Ken has held the position of executive director at the Science Museum of Western Virginia, in Roanoke, Virginia, since 1993. Prior to that he managed a private consulting firm, which he established, in Charlottesville, Virginia.

From 1978 to 1988 Ken was employed at the Baltimore Zoo, successively as a teacher in residence, director of education, and director of marketing and development. He earlier taught geology, chemistry, and biology at a middle school in Baltimore.

Ken holds a bachelor of science degree in biology from Bucknell University, a master of science degree in education/school administration from Johns Hopkins University, and a master's degree in business administration from the Darden Graduate School of Business Education at the University of Virginia.

A Trustee-appointed search committee, headed by Past President Lee Cohn, conducted a nationwide search to find a replacement for Carolyn Polson O'Malley, who resigned following the Garden's successful capital campaign to head a private family foundation. Trustee and former Board President Dr. William Huizingh has served as interim executive director since February 2.



# From exotics to Southwestern natives: An herbal gardening journey

By Kirti Mathura

Photos by Kirti Mathura, (except where noted)

I grew up in Michigan and as a child began gardening with my mother. Along with all the vegetables, flowers, and roses, we grew some herbs. They were the typical garden herbs—thyme, rosemary, basil, mint, and chives. I thought chives were cool because I could plant them between the rose bushes to keep pesky aphids away. Mom liked them (the chives, not the aphids) with baked potatoes. She used all the herbs we grew for creating great delectables in the kitchen. I now regret I didn't spend much time in the kitchen with my mother, learning her culinary skills. I did, however, become interested in other uses of herbs. At high school age, I discovered a recipe for a thyme hair rinse. Easy to make, it left my hair soft and clean smelling. It was then that I also developed an interest in our native plants while taking a botany class.

Later, while I was at school in Montana, my admiration for native plants continued to grow. Now that I am settled here in the Valley, I still grow "exotic" herbs, especially the Mediterranean lavender, thyme, sage, and rosemary that do so well in the desert. Over the years my enthusiasm for both native plants and herbs has merged into a landscape dotted with Southwestern native herbals.

To me, any plant that is useful in some manner—for culinary, cosmetic, craft, dye, medicinal, or other purposes—can be considered an herb. Certainly we are surrounded by a multitude of wonderful native plants here in the Southwest that can be used in one way or another. A number of these herbs—from trees and shrubs to groundcovers, vines and annuals—can double as beautiful and interesting landscape plants for our yards. Being native to our region, many are low maintenance and drought tolerant.

## *Chilopsis linearis* — Desert Willow

This graceful tree grows along washes throughout the Southwest. Its typical mature size is twenty feet tall and fifteen feet wide. Desert willow provides wonderful light shade during



*Chilopsis linearis* flower

the summer and allows for more sun exposure in the winter when it drops all its leaves. Delightful pink and lavender flowers bloom throughout the warm season, attracting hummingbirds and carpenter bees. This plant has been used medicinally and for construction. The dried flowers make a pleasant-tasting, fruity-flavored tea.

## *Salvia clevelandii* — Chaparral Sage, Cleveland Sage

This wonderfully fragrant sage is native to the hillsides of southwestern California. Well-



*Salvia clevelandii*

draining soil is critical for success with this plant, which can grow in full or filtered sun. Allow it plenty of space, as it can reach four to five feet tall and six to eight feet wide. You and the hummingbirds will enjoy the whorls of purplish tubular flowers in the spring. The leaves can be used as a substitute for culinary sage, but incorporate their strong flavor sparingly. The highly aromatic foliage and flowers make wonderful dried arrangements or potpourri.

## *Lippia graveolens* — Mexican Oregano

Mexican oregano grows on dry rocky slopes

of south Texas and Mexico. This shrub reaches four to five feet tall and wide, and is best planted in full sun with well draining soil. It is often winter deciduous. Summer brings tiny, white, honey-sweet fragrant flowers. One of my favorite oreganos, the spicy, deep-flavored leaves dry well for use in cooking.



*Lippia graveolens* flowers

## *Poliomintha maderensis* — Mexican Oregano, Rosemarymint

This delightful shrub, which is native to Mexico, grows three to four feet tall and four feet wide. It should be grown here in filtered sunlight or afternoon shade. All summer, tubular pinkish-lavender flowers are visited by hummingbirds. The flowers can be tossed into salads for color and flavor. The bright green leaves have a peppery, oregano flavor that is tasty in soups, stews, and the like.



*Poliomintha maderensis* in bloom

## *Tagetes lucida* — Mexican Tarragon, Mexican Mint Marigold, Yerba Anís

This fall-blooming gem is native to Mexico

and Central America. Place it in filtered or full sun. It will reach approximately two feet tall and as wide by summer, and put on a show of golden yellow marigold flowers in October. Be aware that it dies back to the ground after a good freeze in winter and resprouts in March. The leaves and flowers make a delicious hot or cold tea. The anise-like flavor of the leaves can be used to flavor vinegars and chicken or other dishes. The leaves have been used to aid digestion and for colds.



*Tagetes lucida*

### ***Monarda citriodora* — Lemon Mint, Lemon Bee Balm**

This annual is native to Texas and southeast New Mexico into the Plains states. Plant the seed in a sunny spot in the fall and by April you will have plants two or three feet tall with whorls of pinkish-lavender flowers (more hummingbird beacons). Try tossing the leaves and blossoms into salad for a minty-oregano flavor, or make a cup of tea. *Monarda* typically reseeds well, so you will have more plants popping up the following year.



*Monarda citriodora*

### ***Salvia columbariae* — Desert Chia**

We usually think of this plant as a spring wildflower, but it is so much more. Native to sandy washes and hillsides of Arizona, California, and Mexico, this annual can be planted from seed in the fall. Whorls of small



*Salvia columbariae*

purple flowers develop on the foot-tall stems in the spring. The protein and oil-rich seeds that are generated have been used for making many food items and soothing beverages. They have also been used as a poultice and for extracting debris from the eye, utilizing the mucilaginous coating that surrounds the seed when it is soaked in water. Also, degrading as it is for our proud native plant, this is the "chia" of "chia pets."

These are only a few of the intriguing herbs native to the Southwest. If you're not already growing any of these plants, try some. You'll be impressed by their beauty and usefulness.

*Kirti Mathura is a horticulturist at the Desert Botanical Garden, in charge of the plants on the Center for Desert Living Trail.*

### **For further reading:**

*At the Desert's Green Edge: An Ethnobotany of the Gila River Pima*, by Amadeo M. Rea

*By the Prophet of the Earth: Ethnobotany of the Pima*, by L.S.M. Curtin

*Food Plants of the Sonoran Desert*, by Wendy C. Hodgson

*Native Plants for Southwestern Landscapes*, by Judy Mielke

*Sonoran Desert Plants: An Ecological Atlas*, by Raymond M. Turner, Janice E. Bowers, Tony L. Burgess

*Wild Plants and Native Peoples of the Four Corners*, by William W. Dunmire and Gail D. Tierney

*Wild Plants of the Pueblo Province: Exploring Ancient and Enduring Uses*, by William W. Dunmire and Gail D. Tierney



# Along the trail: Walking the bird walk

By Barbara R. Long

**F**or fifteen years I had been hoping to see a robin in Phoenix. Finally, while on the early morning bird walk at the Desert Botanical Garden, I saw one. Without expert guides, however, I'd have walked right by it.

Birds get up early, so summer bird walks start early on nearly every Monday morning and the occasional Saturday. There is no guarantee that you will see a robin, but you are guaranteed to see knowledgeable volunteer guides. Six or seven faithful docents come week after week to lead the bird walk because they love birds and so they can split up the group of birders if it is too large.

This is not a tour, so the volunteers don't talk at you all the time. In fact, silence is a vital part of the experience. Listening for an unfamiliar tweet or chirp can lead to unexpected sightings. The docents are along to answer questions and are experts at spotting something most people would miss, like my robin.

"See those two hawks perched on top of the hill?" asks one veteran guide as we walk along the trail. "No. I see two rocks," I respond, but with his guidance and my binoculars, those rocks become two redtail hawks, bookends on either side of the butte.

Not everything is far away. A resident pair of cardinals enjoy a breakfast of palo verde seeds only five feet off the trail. A saw-whet owl sleeps, camouflaged by branches, three feet above my head in a palo verde tree.

The starlings are having a convention in the saguaro forest and have laid claim to many of the cavities excavated by flickers and woodpeckers. Someone asks, "How do we control starlings, an introduced species?" No answer. Later we spot drama high in the sky, a flock of starlings being chased by a Cooper's hawk. That's how "we" control the starlings.

After an hour or so the walk ends at the Patio Café, but not the bird watching. Birds have learned about the handouts there. Seeing a cactus wren is not a problem, but keeping him



Birders with their binoculars look for early-morning birds.

from eating your muffin is a challenge. Gambel's quail scurry by like a flock of chickens, hoping for crumbs.

After the relative silence of our bird walk, conversation around the table is lively. "Was that a red-shafted flicker or a gilded flicker?" "We didn't see the goldfinches today. We usually see a whole flock of them." "When do the white-winged doves come back?"

The people get out their bird lists to mark and date their sightings. While some bird watchers are acquisitive about life lists and "collect" rare birds, others just like to keep track of the comings and goings so they can anticipate events such as the annual robin migration.

Bird watchers learn observation skills, and they learn patience. They accept this as an ongoing pursuit, not a task to be finished and neatly put away or crossed off the list. Most important, a bird watcher learns to be flexible, and to be pragmatic. You never see the same thing twice and sometimes you miss the best part.

Thanking the docents, the bird watchers leave, happy to have touched the natural world even so briefly. Then, as if they were being elusive on purpose, the goldfinches arrive.

For more than seventeen years the Monday bird walks have been a tradition at the Desert Botanical Garden. In summer the birders are ready to go at 7 a.m.; in winter the walks begin at 8 a.m. Advance reservations are not needed and the walks are free with admission, so bring a friend. Also bring binoculars, water, and a hat. Check the Garden Calendar for occasional Saturday bird walks.

The bird walks grew out of "summer sunrise" tours in 1983, and were the idea of volunteers Tillie Chew and Lynn Vogel. These two guides are still loyal regulars, and are usually joined by Charlie Brenner, Judy Flynn, Elizabeth Hubbell, and André Tarby (a bird walk docent since 1984). Computer records of sightings in the Garden exist for those nearly-eighteen years and a new bird list is being compiled.

Unlike most volunteer programs, these loyal docents work without a chair person, proving that committees can function without a leader. Joyce Goodman, David Johnson, and Robert Parker assist on a regular basis. Apologies to other unnamed volunteers who may participate from time to time, as many of us choose that way to spend a morning.

*Barbara R. Long has just completed a two-year term as president of Volunteers in the Garden. She is frequently a docent along the trails.*

# Food Plants of the Sonoran Desert

by Wendy C. Hodgson

331 pp. Tucson: The University of Arizona Press, 2001, \$75.00  
151 illustrations, drawings and photographs;  
four appendixes, bibliography, index

Reviewed by Jennifer Orf

Reviewing Wendy Hodgson's book, *Food Plants of the Sonoran Desert*, requires me to separate Wendy the author from Wendy my friend, but the book—on which she has worked for many years—leaves me impressed with her achievement both professionally and personally.

Wendy, a research botanist and curator of the herbarium at the Desert Botanical Garden, has spent thirty years researching plants. In *Food Plants of the Sonoran Desert* she weaves her own experiences with the scattered literature to present information on nearly 540 edible plants used by at least fifty traditional cultures in and around the Sonoran Desert. In addition, although the book does not mention it, Wendy produced all of the exquisite line drawings in the book and most of the photographs, except when credited elsewhere.

This is a gorgeous book, starting with the book jacket photograph by David Burckhalter and Wendy's line drawing, which are stunning. Her own personality shines throughout the text. Her thoughtful, careful choice of words is as characteristic of her writing as it is of her speaking to a friend.

The section on Agavaceae is the longest section in the book about a single plant family. The descriptions of the different Sonoran peoples and their customs in using the agave are rendered in respectful and particular detail. I felt it answered all of my questions.

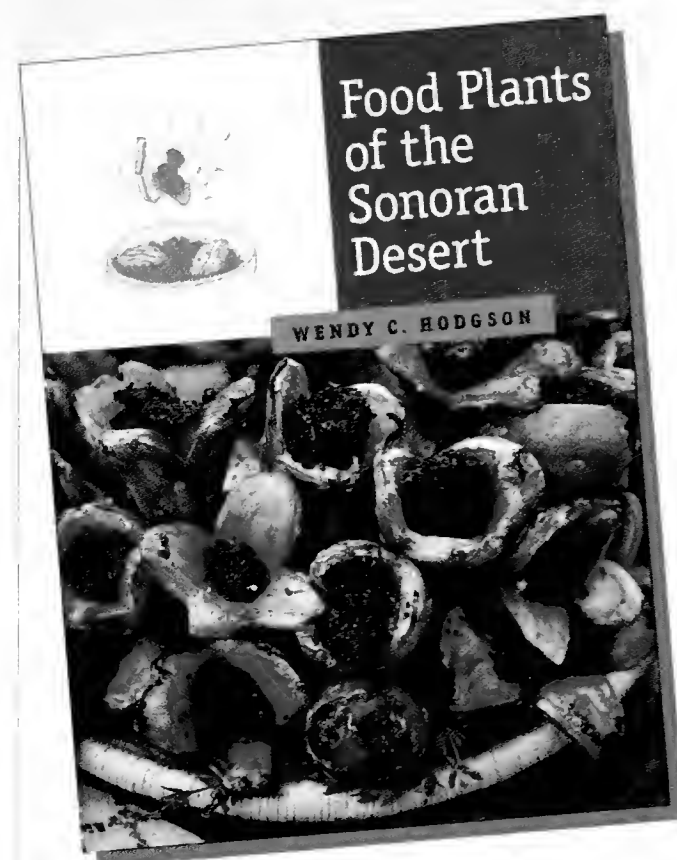
As a librarian, I tend to evaluate all non-fiction books from a reference point of view. In other words, how good is the index? This book

has an extensive index which includes both common and scientific plant names as well as geographic locations, Native American tribes, and noteworthy persons.

In addition to the index, there are four appendixes which I know I will use on a regular basis. They include several charts which complement and enhance the text of the book. For example, Appendix I charts the plant species and parts used, which makes it simple work to determine which part of *Koeberlinia spinosa* is used (the fruit). Two appendixes chart the fruiting periods of edible fruits and seeds. Appendix IV lists common names that are non-English, making this a truly multicultural work.

The book's format is straightforward. The food plants are catalogued in three large categories—gymnosperms, angiosperms: monocots, and angiosperms: dicots. Plants are listed alphabetically within each category. Illustrations and photographs are abundant. The text is peppered with citations, which at first was distracting but soon became rhythmic. The seventeen pages of literature cited at the back of the book not only give the reader pause at the magnitude of Wendy's research, but also provide a fine reading list for the summer. I was awed by how well Wendy pulls together her own observations and knowledge and supports it with citations from her colleagues. This *magnum opus* is truly a remarkable achievement.

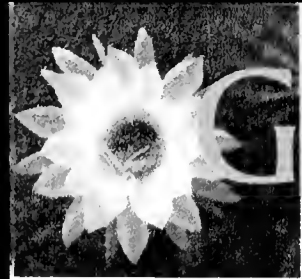
When I finished reading the book, I realized that I had been enlightened. I will never look again at the Sonoran Desert in the same way. I found myself smiling when I read about *Sarcostemma*, also called climbing milkweed. She writes, "The Pima and Tohono O'odham in Arizona and Sonora made a chewing gum from *S. cynanchoides*. . . . They opened the fruits or shoots and collected the white latex that exuded from the damaged part, drop by



drop, into the stem (petiole) of a squash leaf. They cooked the latex filled petiole in the hot ashes of a small fire, then ate the soon-to-harden gum." Chewing gum? Amazing.

*Food Plants of the Sonoran Desert* gives the reader a deeper respect for the ingenuity and inventiveness of the Sonoran Desert people who have come before and who had the insight and wisdom to use the bounty of the desert in ways we cannot imagine today. This book will be a mainstay on the shelves of ethnobotanists, a reference *par excellence* for anyone who loves the desert and wants to understand more fully how native peoples survived here.

Jennifer Orf is the librarian at the Garden's Richter Library.



## Dinner on the Desert

Garden trustee Craig Pearson, seated above, chaired Dinner on the Desert this year with the help of (from left) Jacquie Dorrance, Linda Whitney, and Carol Waldrop, co-chairs. The glittering, festive event included a silent auction of spectacular specimen plants and canvases painted by noted Valley artists.

# TRAIL OPENING

More than 1,200 Garden members celebrated the official grand opening of the Harriet K. Maxwell Desert Wildflower Trail with a special preview and evening reception on Friday, March 9. The general public toured the trail and attended special opening events on Saturday and Sunday, March 10 and 11.

The two-acre interpretive loop trail features impressive year-round wildflower displays from the four deserts of North America, with special emphasis on Sonoran Desert wildflowers. Visitors can gain a unique sense of the variety of desert wildflowers and their environs by visiting along the trail a re-created boulder outcropping, a desert floor, and a shady riparian habitat.

Additionally, innovative exhibits throughout the trail illustrate the complex relationships between desert flowers and the birds, bees, and butterflies that share their desert home.

The meandering trail leads visitors to the new Binns Wildflower Pavilion. The open-air pavilion, which features a magnificent view of the Papago Buttes, provides an ideal venue for social and corporate events.

The grand opening celebration was sponsored, in part, by American Express, Blue Cross Blue Shield of Arizona, and Drum Printing/Mailing, Inc. Promotional support provided by *The Business Journal*.

## Wish Come True

The Garden has received a 920 Caterpillar Wheel Loader donated by Sundt Construction. The 18,000-pound piece of heavy equipment will be used for the Garden's soil, reclamation and compost program, soil processing and mixing, moving large boxed trees and plants, and regrading and landscaping of the Garden's grounds. Prior to receiving the donation from Sundt, the Garden rented wheel loader equipment, which often delayed processing of important and timely jobs.



Photo by Gene Almendinger

Standing in front of the 920 Caterpillar Wheel Loader (from left) are Garden Interim Executive Director William Huizingh, Ph.D., with Sundt Vice President and Phoenix Division Manager Jon Wald, and Chairman and Chief Executive Officer J. Doug Pruitt. Garden Director of Facilities Bob Martin watches from the cab.

## WISH LIST

If the Wish List includes an item you wish to donate, please call the Garden at 480/481-8194.

Desk chair  
Digital camera  
Four-wheel-drive vehicle  
Folding table, eight feet long  
Garden tools, small shovel, pruners  
Golf cart  
Metal soil/kitchen scoops  
Outdoor benches

Palm Pilot  
Plastic dishpans  
Potting table  
Power Point projector system  
Small microwave  
Small refrigerator  
Walkie-talkie radios

## Celebration of Fine Art benefits the Garden

Participants in this year's Celebration of Fine Art Celebrity Auction included Maureen Barkley, Lou Grubb, Marshall Trimble, and Garden Trustees Bennett Dorrance, Bill Huizingh, and Martha Hunter. The March 24th event raised \$9,500 for the Garden and was well organized and promoted by Susan Morrow Potjé. Thanks to Tom and Ann Morrow for their continued support via Celebration of Fine Art!



## Saguaro Society's Spring Tour of Gardens

The Saguaro Society held one of its most popular annual events in mid-March, a tour of private gardens. Enjoying the Jill Faber residence are (from left) Bill and Edith Huizingh and Lynn and Bill Boyce.

## Special Closing

The Garden Plant Shop will close for the summer on June 1st. It will reopen September 1st as part of the new Garden Shop. The Gift Shop will remain open daily throughout the summer from 9 a.m. to 5 p.m.

## Heartfelt thanks to our interim director

In the twelve years in which he has been a volunteer at the Desert Botanical Garden, Dr. William Huizingh has been a trustee for several terms, and has served as president of the board of trustees as well as its treasurer. He has headed board committees such as finance, and has participated in two searches for Garden directors.

He has undertaken singular tasks such as personnel committee projects, an analysis of staff salaries, and serving as treasurer of the capital campaign. He prepared the index of common names for Dr. Ted Anderson's book on cacti. Seeing the need for an official and well-written history of the Garden, he chaired that project—and underwrote it as well.

He has volunteered at many Garden events such as *Luminaria*, he has given tours of the Garden, and he has even painted a picture which was auctioned at the Celebration of Fine Art.

Dr. Huizingh initiated the operating reserve fund for the Garden, so that during the lean seasons of the year we borrow from ourselves instead of a financial

institution. He has endowed the position of executive director.

He has been, therefore, remarkably qualified to be the Garden's interim executive director, serving from February 2 when Carolyn Polson O'Malley left to head a private family foundation.

Dr. Huizingh, who has enjoyed at least two highly successful careers previously—one as a manufacturer in the private business sector and another as a popular and highly esteemed professor of accounting and associate dean of the business school at Arizona State University—brought a lifetime of management experience to the job as interim director. He stepped quickly and smoothly into the position, and served well, gaining high accolades from staff as well as volunteers. He never failed to mention that his term of office was to be brief and temporary. The only payment he accepted was three baseball caps, in various colors, with "Desert Botanical Garden" embroidered on their crowns.

Bill, your term in the office on the west end of Webster has been short, but oh so very sweet. We thank you.

## Volunteers at the Garden: An affair of the heart

Volunteers in the Garden presented a check for \$93,907.76 to John Sullivan, president of the Garden's board of trustees at their annual recognition luncheon in April. The check represents funds raised by the volunteers at their annual *Las Noches de las Luminarias* event, held last December.

During the luncheon, volunteers were recognized for 53,047 hours of service to the Garden in the calendar year 2000. "Beaver tail" awards went to two hundred volunteers, each of whom worked more

than one hundred hours. Twenty-two people joined the ranks of "Hardy Perennials," which marks ten years of service.

Awards for 6,000 lifetime hours were presented to Charles Brenner, Marilyn Shomer, and Ann Turpin Thayer. Margaret Kleinschmidt and Carol Schatt received 5,000-hour gold agave pins.

Congratulations to these volunteers and thanks to everyone who gives time to the Garden.

## New officers for Volunteers in the Garden

Elected in April to serve with Pat McKenna, incoming president of Volunteers in the Garden, were Jim Lightcap, vice president; Barbara Carlson, secretary; and Barbara Lieberman, treasurer. Elected to the nominating committee were immediate Past President Barbara Long, David Caplow, Carolyn Johnson, John Kylander, and Barbara Layton.



# Register now for landscaping school

**R**egistration is underway for the fifth year of the Desert Landscaper Certification Program with classes to begin the week of September 10.

The program is a thirty-week series of workshops which qualifies graduating students to become certified desert landscapers by the Desert Botanical Garden. Many Valley cities as well as commercial landscape companies and private homeowners have sent employees through the program.



DLS students work on the installation of the class landscape design project.

The course is divided into three semesters of ten workshops each. In the first semester students learn how to care for all the major groups of desert plants. In the second semester students master important landscaping skills such as pruning, irrigation, trouble shooting, and care of wildflowers. In the final term students complete and install a landscape design.

The once-a-week workshops can serve as an introduction to desert landscaping for persons wishing to change careers, specialize in the care of desert plants, or improve their hands-on skills. Sessions focus more on skill development than extensive classroom training in order to ensure students are job-ready when they are certified. Students are evaluated on participation in skills training as well as written tests.

Students may register for sessions taught in English on Tuesdays, Wednesdays, Fridays, or Saturdays. Sections will be taught in Spanish on Thursdays and Saturdays. All sessions start at 8 a.m. and end at noon,

except the Saturday Spanish session which will be from 1 to 4 p.m.

A thirty percent discount is available to students registering before September 1. The course fee is \$400 per semester, or a total of \$1,200 (without discount) for the complete program required for certification. A training manual and basic associated materials are included in the registration fee. Garden members may receive a twenty percent discount if they miss the advance registration deadline. No discounts are available for the Saturday sessions. Some full and limited scholarships are available; applications must be returned by August 15 in order to be considered.

For application forms or more information, please contact Diane Barker, interim coordinator of the Desert Landscaping School, at 480/481-8161.

The Desert Botanical Garden is compelled by its mission "to conserve" as well as "to disseminate knowledge about arid-land plants."

In service to that mission, the Garden's Desert Landscaping School (DLS), which certifies graduates as qualified desert landscapers, teaches the principles of desert plants and their care. Created by César Mazier, the Garden's director of horticulture, DLS promotes desert landscaping in order to conserve water as well as to preserve the natural look of the desert environment and to increase interest in native plants.

It has certified 322 Desert Landscapers in four years.



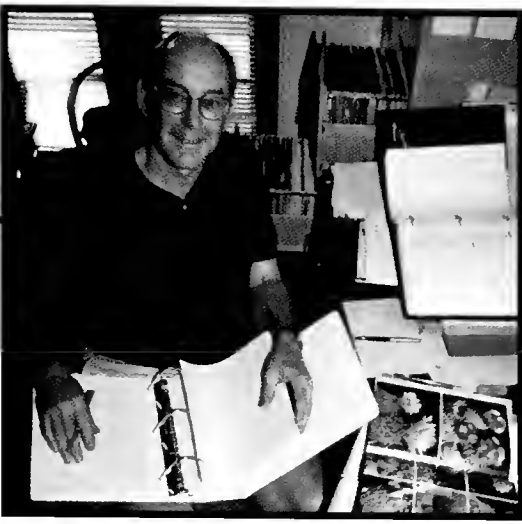
Stone facing goes on the new gift shop as the Garden's \$17 million construction project continues smoothly and slightly ahead of schedule, according to Kayla Kolar, director of administration and planning and also lead project manager for the project.

"By June 1st, we expect the buildings to be stuccoed, and all the roofs will be on," she said. "Work will concentrate on the entry, with the concrete plaza, low walls, and walkways all poured. The canopies will be installed, the windows will all be in, the copper gutters in place. The entry arbor from the parking lot will be in place and

the bridge across the wash will be in its final stages."

The gift shop, plant shop, admissions area and courtyard, and service building are expected to be completed by September with the entire project finished in December.

Visitors to the Garden have enjoyed watching the progress of the construction over the past nine months as they pass from the north parking lot, through admissions, and into the Garden. Once inside they meet the unbroken, calm beauty of the Garden and its undiminished offerings.



## Dr. Edward F. "Ted" Anderson

Ted Anderson at work in his office at the Desert Botanical Garden.

World-renowned author and scholar, and much-loved husband, father, and grandfather, Edward F. "Ted" Anderson died in Phoenix on Thursday, March 29, 2001, after a brief illness.

Most recently the senior research botanist at the Desert Botanical Garden, Ted was known around the world as the leading authority on cacti, his principal study during a long, fruitful and adventurous career as a botanist. Equally important was his family, who survive him—his seven children, five grandchildren and beloved wife of forty-five years, Adele.

Ted's forty-five year career included teaching, writing, and field research all over the world. After obtaining degrees from Pomona College and the Claremont Graduate School in Claremont, California, he served as professor of biology at Whitman College, Walla Walla, Washington, for thirty years. During sabbatical leaves he took positions as a professor and resident scholar at the University of Guayaquil, Ecuador; the University of Malaya in Kuala Lumpur, Malaysia; and Chiang Mai University in Thailand. He travelled extensively to almost every continent, giving lectures and doing

academic field work and projects for groups such as the World Wildlife Fund. In addition to numerous scholarly articles, his work produced several ground-breaking books, including *Peyote: The Divine Cactus and Plants and People of the Golden Triangle* and *Threatened Cacti of Mexico*.

His magnum opus, *The Cactus Family*, a long-awaited, monumental study of the world's cacti, was published—to enthusiastic critical praise—just prior to his death.

Among his many professional honors, in 1998 he was awarded the prestigious Cactus d'Or by the Principality of Monaco for outstanding research on succulents. He was past president of the International Organization for Succulent Plant Study, a member of the Cactus and Succulent Society of America, and a fellow of the Linnean Society, London.

Ted was a longtime member of Rotary International, serving as chapter president and helping to establish and raise funds for numerous Rotary projects around the world. He was an active elder in the Presbyterian

church. His commitment to service extended into many other areas as well, most recently helping to support facilities for orphans and students in northern Thailand.

A man who enjoyed people immensely, Ted made friends everywhere, from tribal medicine men in the jungles of Asia, to professional colleagues in dozens of universities and botanic gardens, to his local church. He especially enjoyed his large family, and nothing pleased him more than building a treehouse for his grandsons or a dollhouse for his granddaughters.

Ted is survived by his wife, Adele; his children, Clark, Adrienne Fioretti, Duc, Erica, Monica, Stephen and Bruce; his sister, the Rev. Elizabeth Moore; and his brother, Dr. William Dale Anderson.

Memorial contributions may be made to: Horizon Presbyterian Church, marked for the "Margaret's Orphans' Fund," 1401 East Liberty Lane, Phoenix, Arizona 85048; or the Desert Botanical Garden, for the "Edward F. Anderson Fund," 1201 N. Galvin Parkway, Phoenix, Arizona 85008.

## Ted Anderson: A personal remembrance

Being a scientist means gathering and interpreting information.

It also means publishing, making this information and your interpretation accessible to your peers and colleagues. This can be a scary thing. We all value our ideas and conclusions, and putting them out for criticism by others requires real bravery.

Ted Anderson was a great scientist, not just because he devoted himself to the gathering and interpretation of information, but because he was fearless in making his conclusions public. In his slide shows he often included a picture of an alligator and joked about the need for a "thick skin" if you want to be a scientist.

But I don't believe Ted had a thick skin. I think

he realized that the only way for knowledge to grow was for everyone to share. Thus he shared willingly, and if his conclusions were found to be faulty by later researchers, Ted was philosophical about it.

In 1986 he published an article proposing that the genus *Turbinicarpus* should be included in the genus *Neolloydia*. He presented a carefully researched and clearly written argument. Unfortunately, no one agreed with him at the time, and now fifteen years later his idea has been tossed aside.

I asked him once how he dealt with having his idea so totally rejected. Although I'm sure it bothered him at some level, his answer was that his article had forced others to reevaluate the plant group and come up with a better answer. He was content that he had contributed to

expanding the knowledge we have of the two genera. He did not glorify or belittle his own contribution nor that of others, but rather was pleased that we now know more about the plants he studied and loved.

His modesty and his work were remarkable things. Although he was a great scientist and botanist, he never crowed about his work. In fact, he bragged more about a set of wooden shelves he and I built in the herbarium, and about the playhouse he built for his grandchildren, than he ever did about his scientific accomplishments. He was always happy to talk about his work and share his knowledge with anyone interested but he never felt the need to impress anyone with it. His quiet dignity in this and in all else is what the Garden, and I, will miss most.

—Tracy Omar, curator of the Living Collection



The Desert Botanical Garden is grateful for the support of all 10,046 members. Recognized here are members of the President's Club, Director's Circle, Curator's Circle, Saguaro Society, and The Sonoran Circle. Also listed are donations and memberships received from **January 1 to March 31, 2001**, for Ocotillo Club, Boojum Club, Agave Century Club, and Desert Council.

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Have you provided for the Desert Botanical Garden in your will or estate plans? If so, you may qualify for membership in The Sonoran Circle. For more information call Beverly Duzik, director of development, at 480/481-8111.

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*Honorary & memorial contributions are used to provide for the ongoing horticultural, education & research programs of the Desert Botanical Garden.*

*From January 1, 2001, to March 31, 2001, contributions have been received in honor of:*

Edward F. Anderson, Ph.D.  
Clark Anderson

Jean Besich  
Pamela & Richard Smith

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Audrey & Jerry Michelson

*From January 1, 2001, to March 31, 2001, contributions have been received in memory of:*

Edward F. Anderson, Ph.D.  
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Martha T. Chapman  
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## MEMORIAL TREES

*Gifts through the Memorial Tree program provide for horticultural maintenance of the trees on the Center for Desert Living Trail. Contributions have been received in memory of:*

Alan J. Cunnie  
Elaine & Daniel Gruber

Arthur O. Hecht  
Edith Hecht

Jim Jones  
Mary Jo & Gene Almendinger  
Vivyan Connolly  
Ann Farber & William H. Drake  
Kirti I. Mathura  
Jacqueline Miller  
Carolyn & Mark O'Malley

The Levete Twins  
Medpro Psych Annex

## SHADE ISLAND

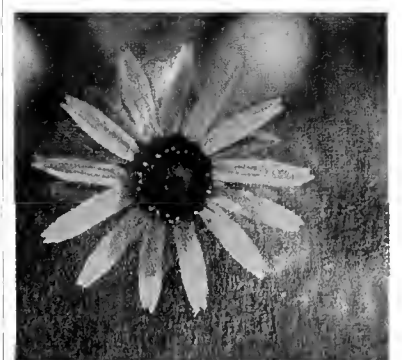
*A shaded area along the Desert Discovery Trail has been dedicated in loving memory of:*

Calvin C. Straub  
James W. Elmore

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Baker Nursery  
Joe Beeler  
Sherri Belassen  
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David E. Brown  
Erik Budd  
Shawn Cameron  
Canyon Pottery  
Ann Coe  
Brian Cook  
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Mary Helen Mason  
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Nursery  
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Oest Metalworks  
Papago Inn  
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Pearson & Company  
Chris Pelley  
Nancy Pendleton  
Photos by Brenda  
Rico Pippert  
Plants for the Southwest  
Michael Prepsky  
Cynthia Rigden  
Ellen Skidmore  
Kevin Sloan  
Karolyn Snarr  
Alix Stefan  
Beth & Tom Steuber  
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Suzanne Brown Gallery  
Daryl Weil  
Whitfill Nurseries  
Beth Zink

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## Desert Spirit Lotions and Hand Cream

These Southwestern lotions and hand creams are made from native plants and are enriched with all natural vitamins A, D, and E along with aloe vera and jojoba. These moisturizers help revitalize sub-skin layers and achieve younger looking skin. Available in Desert Eucalyptus, Prickly Pear, Citrus of the Desert, and Desert Rain scents.



4 oz. Hand Cream, \$7.75  
8 oz. Body Lotion, \$6.75



## Medicine Plates

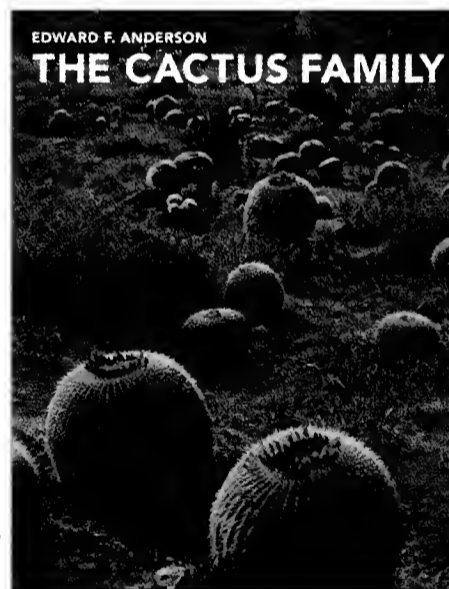
Ancient tradition holds that certain metals have medicinal qualities that help maintain well being. Add to this the healing roles animals and symbols have played in Native American tradition and you have the "Medicine Plate" which will provide you with inspiration. Each medicine plate is handcrafted by a silversmith, first hand beating the copper plate and then overlaying the copper symbol.

Price range \$24.00 to \$58.00

## *The Cactus Family*, Edward F. Anderson, Ph.D.

In this new book, the late Dr. Anderson covers the family Cactaceae in an encyclopedic manner, addressing 125 genera and 1,811 species. Descriptions are short but information-packed, and the book includes 1,022 color photos. The introduction to each genus concentrates on the discovery of the cacti and the improvements in our understanding of them, in many cases as a result of relatively recent investigation. This makes the book a vivid case study of the science of plant taxonomy or plant systematics. Dr. Anderson was senior research botanist at the Desert Botanical Garden.

Hardcover, \$99.95

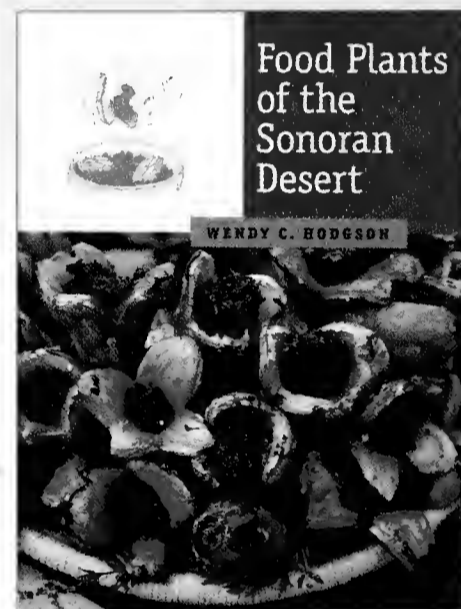


The Sonoran Quarterly **SUMMER**  
June 2001 | Volume 55, No. 2

## Food Plants of the Sonoran Desert,

Wendy C. Hodgson

The seemingly inhospitable Sonoran Desert has provided sustenance to indigenous peoples for centuries. Fully one-fifth of the desert's flora are edible. This volume presents information on nearly 540 edible plants used by people of more than fifty traditional cultures of the Sonoran Desert and peripheral areas. This book is an invaluable compendium for anyone interested in the desert's hidden bounty. Wendy C. Hodgson is a research botanist and herbarium curator at the Desert Botanical Garden. Hardcover, \$75.00



Please see the  
Garden's websites for more  
shopping choices  
at <http://www.dbg.org> or  
<http://www.dbgselect.org>.



The Sonoran Quarterly  
Desert Botanical Garden

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# Desert Botanical Garden 2000 ANNUAL REPORT



## Report to the Members

*"The purpose of the Desert Botanical Garden shall be to exhibit, to conserve, to study, and to disseminate knowledge about arid-land plants of the world, with special emphasis on succulents and the native flora of the Southwestern United States."*

*—Articles of Incorporation, 1937*

Every day of the year we at the Desert Botanical Garden attempt to frame our daily work in the context of our mission "to exhibit, to conserve, to study, and to disseminate knowledge" about the world's arid-land plants.

We are also charged by our founders to present "a compelling attraction."

We believe that we performed well the duties of our mission during the fiscal year from October 1, 1999, through September 30, 2000.

Early in that fiscal year, just before Thanksgiving 1999, more than 850 supporters of the Desert Botanical Garden gathered for a breakfast rally at The Phoenician resort. The rally launched the last phase—aimed at the broad community of Phoenix and environs—of the Garden's capital campaign, which by then had achieved more than \$16.5 million in gifts and pledges towards its goal of \$17.7 million.

The Harriet K. Maxwell Desert Wildflower Trail opened in spring of 2000 as the Garden's newest exhibit with its beautiful Binns Wildflower Pavilion available for outdoor receptions and other events. During the year Garden visitors have enjoyed watching the new plants settle in on the trail, grow and begin to look "at home."

By September 2000 groundbreaking and construction had begun on the new buildings and facilities envisioned in the Garden's long-range plan and financed by the successful capital campaign. When completed in December 2001, the new facilities will increase the Garden's under-roof space from 10,000 square feet to 40,000.

Despite what could be extreme distraction and commotion caused by a major capital campaign and extensive building project, the general work of the Garden continued undiminished. The Garden's three collections—the living plant collection, the library collection of books, papers, and illustrations, and the

herbarium collection of preserved specimens—continued to be well cared for and well used.

A beautiful and professional history of the Garden was published in the fall of 2000. Rich in text and photographs, *Oasis in the City: The History of the Desert Botanical Garden* provides a well-written and engrossing record of the Garden's growth during its first sixty years.

Liz Slauson, Ph.D., director of research, and Wendy C. Hodgson, M.S., research botanist, were asked to prepare a guide to the plants along the 780-mile Arizona Trail. During the next three years they will hike the trail in segments, capturing a total record of the flora along the route which extends from Coronado National Memorial on the border with Mexico through the center of the state past Jacob Lake to Coyote Valley and Buckskin Mountain near the Utah boundary.

Other highlights of the year were: Plans for the next new exhibit, on *Opuntia* cacti, were begun. "Sammy Saguaro's Scrapbook," an interactive, animated, educational website, was launched in July 2000. Spanish translations of the Garden's school materials were created to increase the accessibility of Garden education opportunities for school children. César Mazier, director of horticulture, began a weekly gardening segment in Spanish on a local Spanish television station. The Garden's two plant sales broke all previous records.

The number of basic, individual memberships declined in this fiscal year, but memberships at all other levels increased. Although the Garden suffered some decrease in overall visitation, as did other museums and attractions throughout the state, the Garden completed its fiscal year debt-free and in good financial health.

John Sullivan  
President, Board of Trustees

William Huizingh, Ph.D.  
Interim Executive Director

# Financial Statements

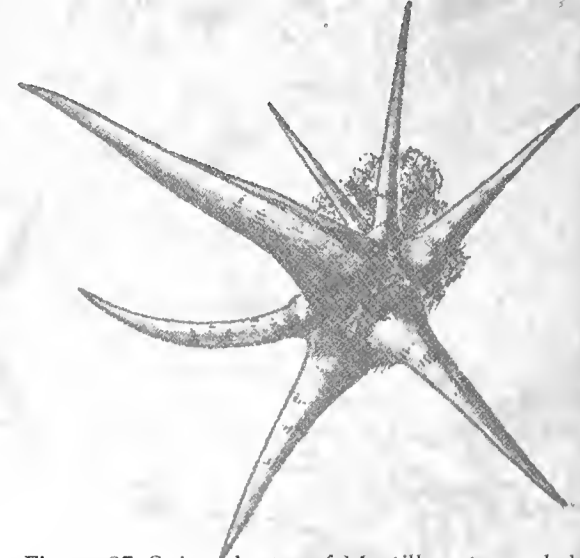


Figure 85. Spine cluster of *Myrtillocactus cochal*

## Information as of September 30, 2000

Fiscal Year 1999-2000 provided another successful chapter in the life of the Desert Botanical Garden. Our financial position continues to improve and is on target with our Board of Trustees' expectations. This was the first full year of collecting on capital campaign pledges. As of September 30, 2000, we had collected \$8,331,418 on pledges and spent \$1,547,319 on improvements. A total of \$16,572,694 had been pledged to the capital campaign by September 30, 2000. This commitment from our Board and the community has been gratifying. We are truly in a strong position to expand on what Garden founder Gertrude Divine Webster envisioned for the Garden. Our programs continue to meet the needs of our community and serve as an invitation to understand our mission of conservation, exhibition, and disseminating knowledge of arid-land plants.

Retail, special events, and membership revenues have increased from 1999. Special events continue to draw more members and their guests. Even though the number of individual memberships declined from the previous year, revenue from memberships increased due to members joining at higher levels.

Our admission revenue decreased from \$996,625 in 1999 to \$923,952 in 2000. A combination of factors probably contributed to that decline, including an overall decrease in tourism to the area. We are exploring ways to increase admission revenue by means of stronger appeal to local residents.

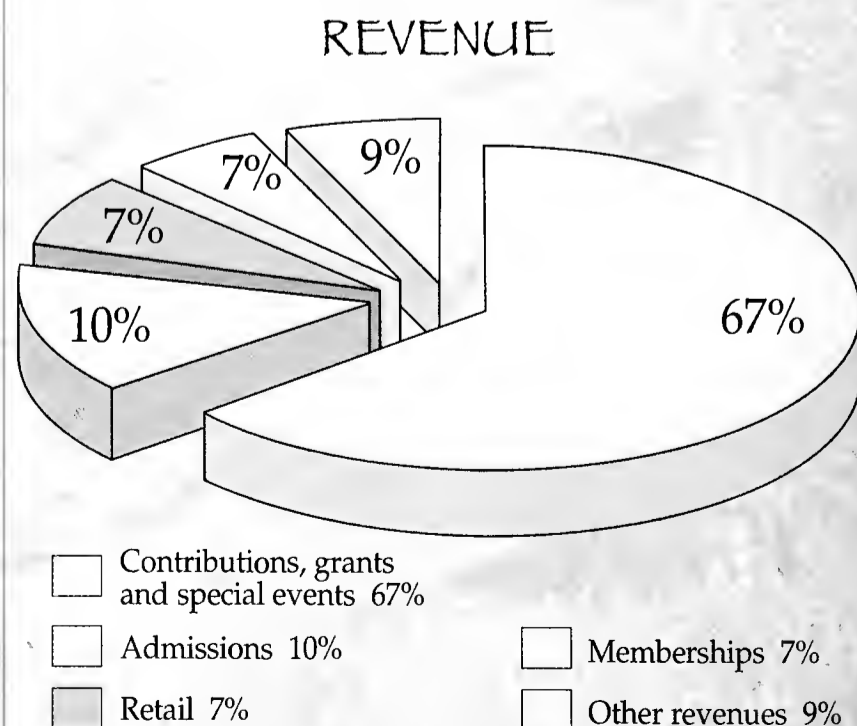
At midyear we saw that admission revenue was not meeting our expectations. Senior management therefore cut costs for the remaining six months and were able to reduce total expenses by \$138,922 compared to 1999 without sacrificing productivity or quality. This endeavor was truly a team effort encompassing participation from senior management, staff, and volunteers.

Craig S. Savage  
Director of Finance

## STATEMENT OF ACTIVITIES

Revenue	9/30/00	9/30/99
Contributions, grants and special events (net)	\$ 5,905,704*	\$ 9,281,593*
Admissions	923,952	996,625
Retail (net)	621,170	586,626
Memberships	590,583	559,249
Other revenues	783,525	273,216
<b>Total revenues</b>	<b>\$ 8,824,934</b>	<b>\$11,697,309</b>
<b>Expenses</b>		
Program expenses	\$ 2,859,716	\$ 2,911,467
General and administrative	600,478	616,316
Fundraising and membership development	366,193	429,868
Retail	192,127	246,896
<b>Total expenses</b>	<b>\$ 4,018,514</b>	<b>\$ 4,204,547</b>
<b>Change in net assets</b>	<b>\$ 4,806,420</b>	<b>\$ 7,492,762</b>

\*Includes Capital Development Campaign revenues of \$5,057,764 for 9/30/00 and \$7,936,763 for 9/30/99.



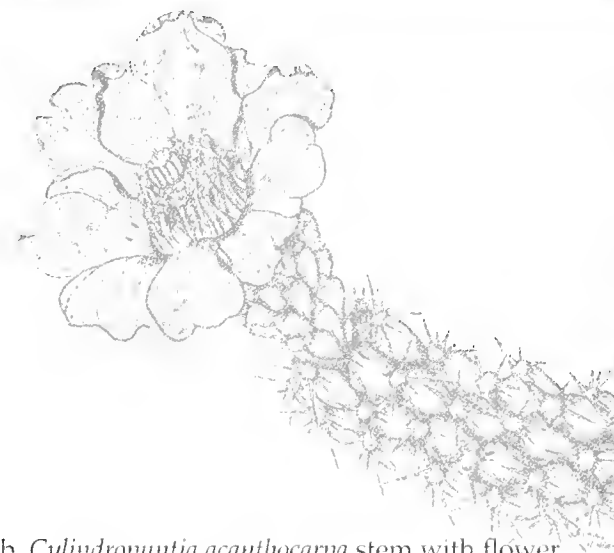


Figure 71b. *Cylindropuntia acanthocarpa* stem with flower

## STATEMENT OF FINANCIAL POSITION

Assets	9/30/00	9/30/99
Current assets	\$ 6,519,780	\$ 3,847,350
Investments	54,934	420,756
Cash restricted for future use	18,073,124	2,060,338
Pledges and other receivables	4,027,743	2,582,883
Property and equipment (net)	5,300,251	4,420,633
Bond issuance costs	198,507	—
Other assets	64,782	39,951
<b>Total assets</b>	<b>\$ 34,239,121</b>	<b>\$ 13,000,911</b>

## Liabilities

Accounts payable	\$97,266	\$63,000
Accrued expenses	126,893	120,299
Deferred revenues	196,945	161,777
Accrued interest	63,114	—
Capital lease obligations	3,649	11,001
Bonds payable	16,300,000	—
<b>Total liabilities</b>	<b>\$16,787,867</b>	<b>\$356,077</b>

**Total net assets** \$17,451,254 \$12,644,834

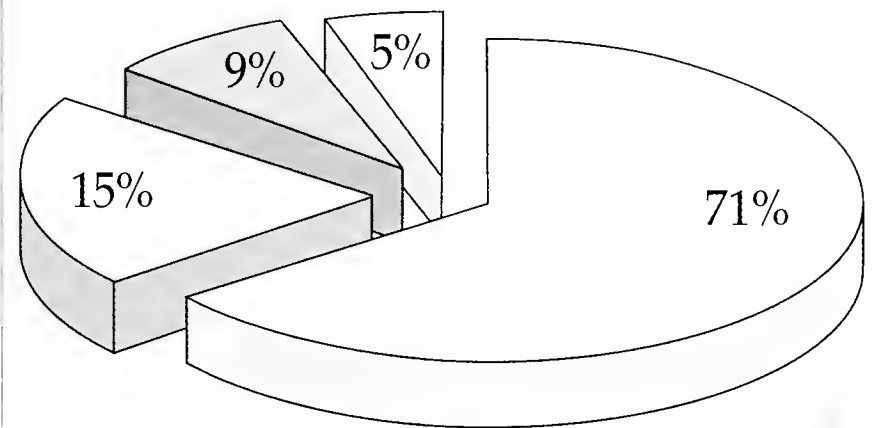
**Total liabilities and net assets** \$34,239,121 \$13,000,911

## Capital Campaign Activity

Cash received	\$ 8,331,418
Less expenses	(1,547,319)
<b>Net cash</b>	<b>\$ 6,784,099</b>

The Garden has received an unqualified opinion from its auditors, Miller Wagner & Company, PLLC, Certified Public Accountants, on the audit of its financial statements for the years ending September 30, 1999 and 2000. A summary of the financial statements is provided here. Copies of the audited financial statements are available upon request from the Desert Botanical Garden Business Office at 480/481-8198.

## EXPENSES 2000



☐ Program expenses 71%    ☐ Fundraising and membership development 9%  
☐ General and administrative 15%    ☐ Retail 5%

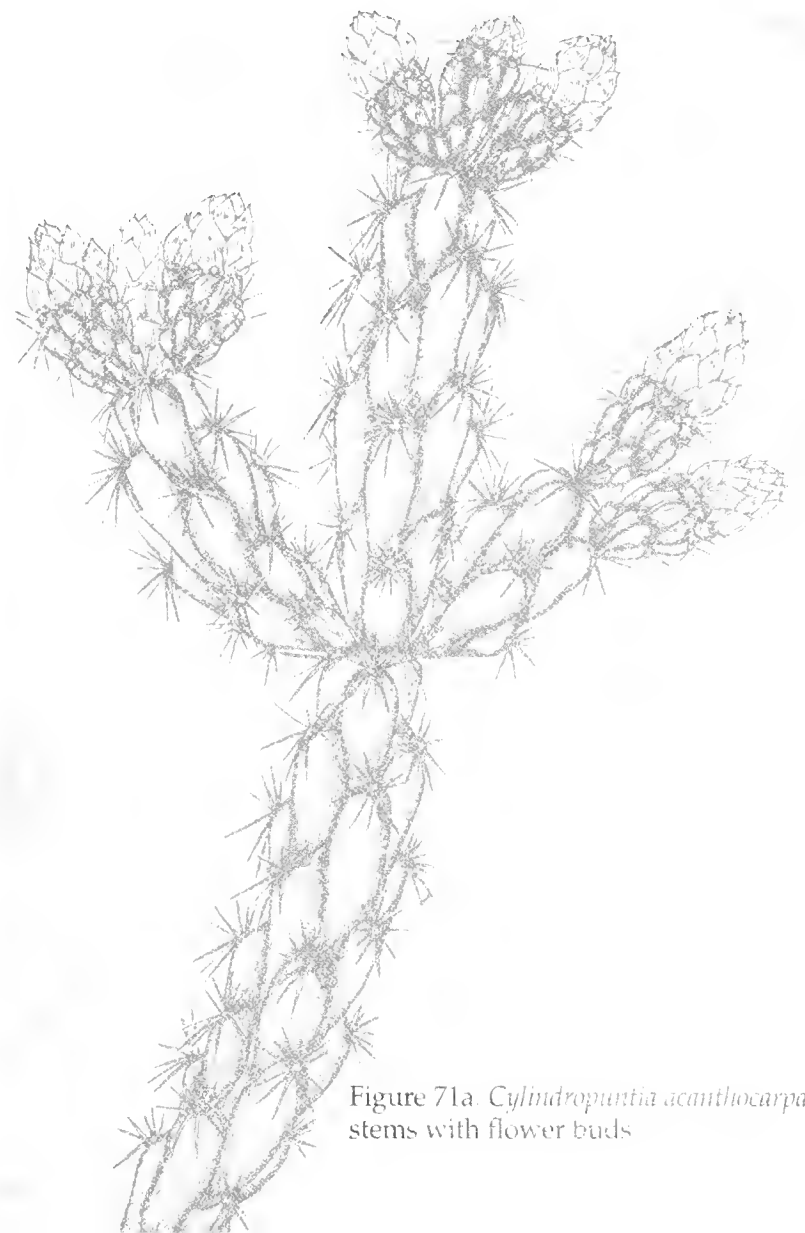


Figure 71a. *Cylindropuntia acanthocarpa* stems with flower buds

# The Garden BY THE NUMBERS

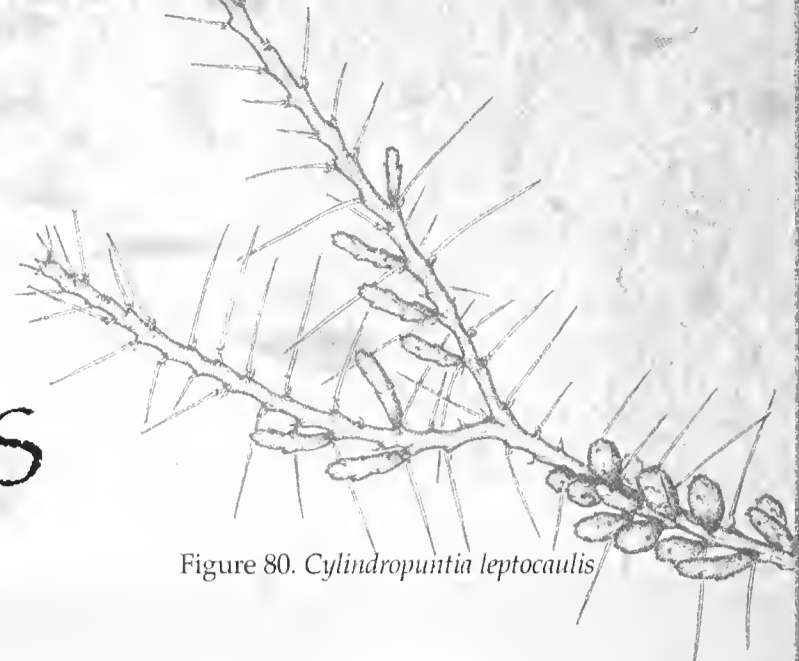


Figure 80. *Cyindropuntia leptocaulis*

Total memberships: 8,838  
Total yearly attendance: 230,701

## Living Collection

New plant accessions: 92  
Total living accessions: 10,621  
Total living plants: 19,699  
New species added: 7  
Total plant species: 3,925

## Rare and Endangered (Center for Plant Conservation)

Total accessioned seeds and plants:  
approximately 3,000  
Total CPC species: 38

## Herbarium

New herbarium accessions: 1,434  
Total herbarium specimens: 45,594

## Library

Number of library titles: 6,124

## Volunteers

Number of volunteers: 554  
Volunteers working 100 hours or more: 247  
Total volunteer hours: 54,059  
Number of docents, guides, interpreters, hosts: 149  
Number of horticultural aides: 50

## Tours & Education

Number of tours: 1,277  
Participants in tours: 27,805  
Types of tours: 15  
Number of visitor interactions with docents, staff, or  
special demonstrators: 122,865  
Workshops offered: 59  
Participants in workshops: 788  
Students on field trips to the Garden: 28,375  
Number of Outreach Puppet Shows: 166  
Number of students seeing Outreach Puppet Shows: 12,113  
Number of teachers & educators using Garden  
programs: 250

## Horticulture

Total acres at Desert Botanical Garden: 145  
Acres under cultivation: 52  
Number of plants in horticulture: 40,000+  
Number of plants (in collections and non-accessioned)  
planted this year: 1,600  
Number of graduates of the Desert Landscaping School: 223  
Number of calls to Plant Questions Hotline: 2,340  
Number of annual plant sales: 2

## Staff as of April 2001

Full-time: 59  
Part-time: 12  
Number of interns: 10

## How to reach us:

Write: 1201 N. Galvin Parkway, Phoenix, AZ 85008  
Call: 480/941-1225  
Fax: 480/481-8124  
Website: [www.dbg.org](http://www.dbg.org)  
E-mail: [dbgadmin@uswest.net](mailto:dbgadmin@uswest.net)

Figures 71, 80, 85, and 121 from *Food Plants of the Sonoran Desert*, by  
Wendy C. Hodgson. Copyright © 2001 The Arizona Board of  
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The Desert Botanical Garden's mission is to exhibit, conserve,  
study and disseminate knowledge of arid-land plants of the world,  
with a particular emphasis on succulents and the native flora of the  
Southwest United States.

**Desert Botanical Garden**  
Established in 1939



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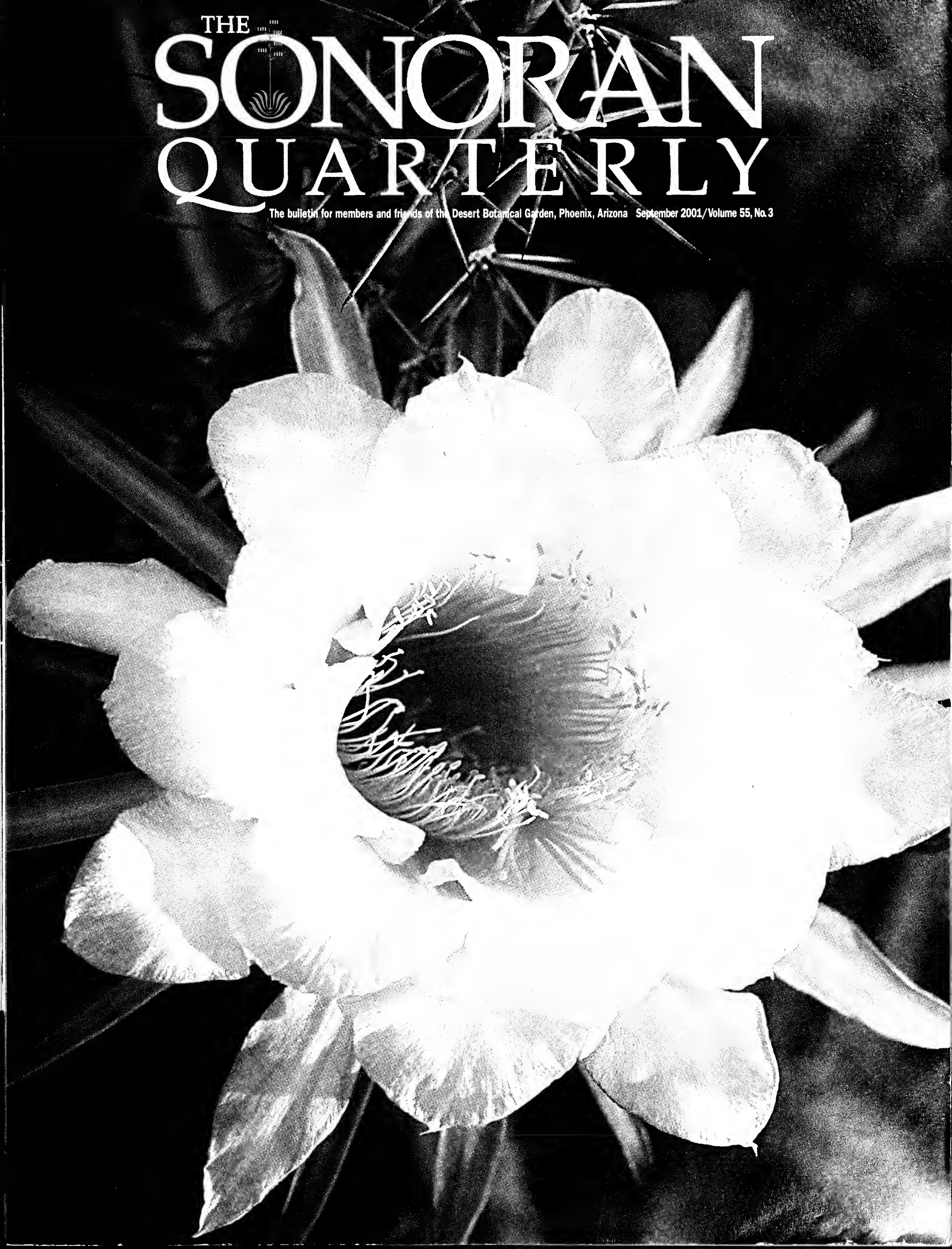
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☐ I would like information on including the Garden in my will or estate plan.

# THE SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona September 2001/Volume 55, No. 3





# From my garden to yours

For more than twenty years I have worked for mission-driven cultural institutions—including ten years in marketing and fund-raising at the Baltimore Zoo, and eight years as the executive director of the Science Museum of Western Virginia. During that time, I have always found solace and relaxation in one particular pastime—gardening.



Clematis

in bloom this spring and summer. The peonies, clematis, and iris were my favorite spring bloomers. The coneflowers, loosestrife, and crocosmia stole the show when summer came to my garden back east. And potted annuals, like verbena and daisies, added extra color throughout the growing season.

Leaving my garden behind and coming to the Desert Botanical Garden—*your* garden—has opened up all kinds of new possibilities for me. There is much for me to learn about desert ecology and the cultivation of desert plants, and I'm anxious to get started. But don't worry. You won't see me practicing in any of the Garden's formal beds—I'll leave their care in the very capable hands of our horticulturists and curators. Instead, look for me this fall in the backyard of Desert House—soon to be my new home—planting, pruning, weeding and, more likely than not, wondering if it will rain anytime soon. ☀

*Ken Schutz*  
the Dr. William Huizingh Executive Director



Summer perennials



Coneflowers

Knowing this, I'm sure you can understand just how fortunate I feel to have been named the tenth director of the Desert Botanical Garden. My passion for environmental education and conservation, and my sheer delight at sinking my hands into fertile soil and watching a garden grow, are now married in one fantastical endeavor called—ever so inadequately—my work.

I moved to Phoenix from the town of Blacksburg, in Virginia's Blue Ridge Mountains. It was there, on a small hilltop, that I tended a garden of (mostly) native annuals and perennials, and I can think of no better way to introduce myself than by sharing with you some photos of my garden

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## THE SONORAN QUARTERLY

September 2001  
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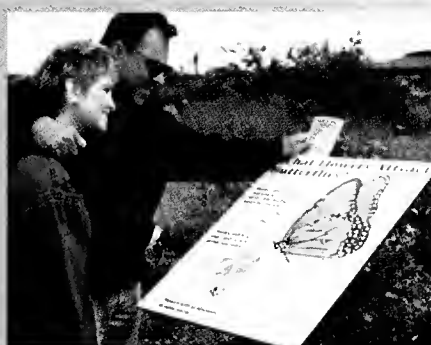
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## ON OUR COVER

The fragrant flower of *Echinopsis spachiana*, Golden Torch Cactus, a night-bloomer and a summer-bloomer, opens along the trail at the Desert Botanical Garden.

Photograph by Jennifer Johnston



# Our kids need an inspiring

By Ruth Copeman

## The Problem

A group of 120 schoolchildren recently visiting the Garden were asked to raise their hands if they live in a desert. Only two children did so! Questioned further, most explained that they lived in Phoenix, whereas the desert is outside of town. They were asked if they had ever seen a rabbit (most said no), our state bird, the cactus wren (most had not), or tasted the fruit of a cactus (none had). While they had seen a saguaro a few times, they were filled with misinformation, some of which could even be harmful. For example, most believed you can drink water from the inside of a cactus.

Teachers, too, are at a disadvantage. Materials provided for teaching subjects such as food webs, life cycles, and the concepts of adaptations and habitats are almost entirely focused on the tropical rain forest or the ocean. In addition, many teachers have moved here from elsewhere and are therefore unfamiliar with the Sonoran Desert and its inhabitants.

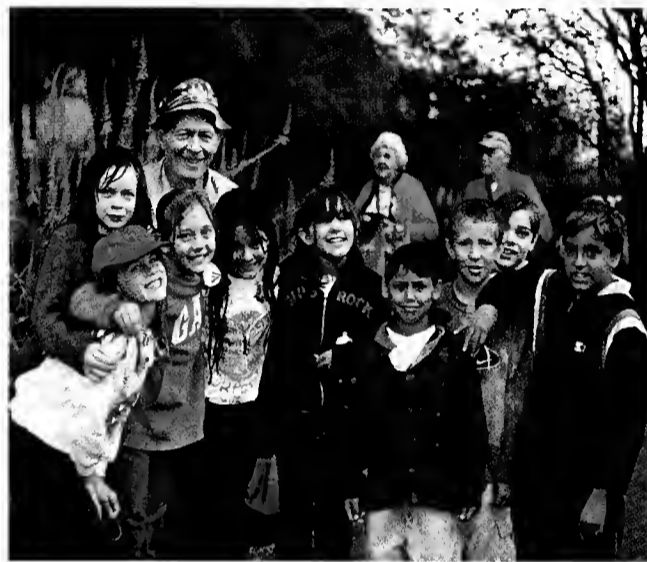
## A Solution

The Garden's multifaceted *Sonoran Desert Adventure Program* brings to students and teachers the thrill of discovering their fantastic desert home. This program captivates students both at the Garden and in their classrooms and also provides teachers with resource materials and training about Sonoran Desert plants, animals, and people.

## Onsite Activities

*Guided Discovery Tours:* Specialized Garden volunteers called SAGEs (*Sonoran Desert Adventure Guides*) escort small groups of students through the Garden and provide them with an experience that is both thrilling and educational. Students studying the desert

as a habitat, a required part of the second-grade curriculum, weave a desert "web of life" by learning the plants that are key to the survival of local wildlife and how the animals contribute to the success of the plants in return. The students taste cactus



This group, with their guide Don Berg, were having a great time—even though it was raining.

fruit and mesquite beans (key sources of nutrients for desert animals) and play observation games that help them focus on the topics of finding food, water, and shelter.

Students studying the history of Arizona, a requirement of the fourth-grade curriculum, create a shopping list of everything they need to survive and then go "shopping" on the Plants and People of the Sonoran Desert trail. They learn how to make rope from agave leaves, paintbrushes from yucca leaves, soap, tools, shelter, clothes, cosmetics, musical instruments, and much more—all from local native plants.

*"Thanks for the field trip. We had so much fun at the Botanical Garden. When we barely got there I thought it was going to be boring. As soon as I saw all of the plants I got excited. It was really fun and I want to go again, even with my family."*

—Abdiel, fourth-grade student.

*"Dear Nancy, Thank you for being my guide for my field trip. When we went to the Desert Botanical Garden it was a blast. We saw cactus wrens. They were amazing. Those mesquite beans were so cool, too. Being at the desert here was better than any other visit to any other place."*

—John, third-grade student.

*The Desert Detective:* Students put on their detective caps and are provided with one of three mysteries to solve: *The Mystery of Desert Plants*, *The Plant and Animal Partnership*, or *The Plant and People Connection*. Each of these intriguing game sheets contains sixteen items for students to find while also teaching important concepts about the desert environment. Activities along the trails support each



These students are hard at work looking for clues to solve their Desert Detective mystery.

# Sonoran Desert lesson

game. The best part is that the answers can change each time the game is played, so it remains interesting each time. The Desert Detective series has been used as a model throughout the country (the New York Botanical Garden used it in their Desert Habitat) as well as abroad (the Kirstenbach Botanic Garden in Africa has developed its own version). The entire Desert Detective program, including the game sheets, maps, and chaperone orientation, is available in Spanish.

*"Quisiera visitar otra vez el jardín. Me gustó el jardín. Le voy a decir a mi mamá que me lleve. Ella siempre me lleva a diferentes lugares los sábados y los domingos. Este sábado le voy a decir que me lleve al jardín."*  
(*"I would like to go again to the Garden. I liked the Garden. I'm going to tell my mom to take me. She always takes me places on Saturday and Sunday. This Saturday I'm going to tell her to take me to the Garden."*)  
— Margarita, third-grade student.

*"Thank you for letting us visit the Garden. My Aunt Elizabeth has a cactus in her front yard. I could tell her that her cactus is a prickly-pear cactus."*  
— Leticia, third-grade student.

## Outreach Activities

**Desert Puppet Show Series:** Classes which cannot come to the Garden or would like to supplement the Garden experience can have a professional puppeteer visit their classroom. The three shows, *Hotel Saguaro*, *Seasons of the Desert*, and *Desert Night and Day*, were developed through a partnership with the Great Arizona Puppet Theater. The stars, a young saguaro named Sammy and his Grandpa, interact with neighbors such as the queen-of-the-night and prickly-pear cacti, a rattlesnake, bats, doves, and others.



Puppet shows by professional puppeteers bring the subject to life.

The students learn about the desert environment as well as the art of puppetry. *Hotel Saguaro* has even been performed for the United Nations. This program is entirely supported by donations.

*"Thank you for sending the puppet show about mesquite trees to my school. I liked the show because I learned many things about the mesquite. It gives food to people and animals. It looks nice and it changes during the different seasons. I want to have a mesquite tree in my backyard and in my front yard."*  
— Robert, fourth-grade student.

## Teacher Training

**Desert Web:** This sixteen-hour workshop explores the formation of the Sonoran Desert and how plants, animals, and people thrive here. Teachers receive an extensive resource notebook, hands-on materials for the classroom, and invaluable experience in the very environment about which they will be teaching. They also gain stimulating techniques for delivering the information they learn to students. Staff members of other museums, Scout troop leaders, home-school educators, and out-of-state educators have joined us in this intensive, fascinating experience.

Training teachers about the desert multiplies

the reach of the Garden's message in two ways. First, it introduces and excites educators about their local environment, encouraging them to learn more. And second, they will pass that message on to hundreds of students during their careers. Teachers in all local school districts may apply the sixteen hours toward their re-certification credits.



These teachers decorate pottery with paint they have made from a mesquite tree.

*"This has been the best experience for me! I am astounded and inspired by my home in the Sonoran Desert! I can't wait to incorporate these activities and materials into my entire curriculum!"*  
— 2001 Scottsdale fourth-grade teacher.

We have all heard that today's youth are tomorrow's future. It will be up to the children of the Valley to care for their unique, diverse, and shrinking Sonoran Desert home. Exposing young people to their natural environment is an integral part of ensuring the conservation of our desert. In the words of Baba Diom of Senegal, *"In the end we will conserve what we love, we love only what we know, and we will know only what we are taught."*

We appreciate the generosity of the following corporate members for making these outstanding education programs possible: The Arizona Republic Season for Sharing, APS, Bank One, Desert Schools Federal Credit Union, Intel Corporation and Phelps Dodge Foundation.

Ruth Copeman is environmental education coordinator at the Desert Botanical Garden.



## An armchair tour of our Garden's

By Elaine McGinn

**H**ardhat tours of the Garden's new facilities have been going on a year, since September 2000. The Garden project managers—Kayla Kolar, Bob Martin, and I—never tire of donning hardhats and leading donors, volunteers, staff, and interested others through the project. The excitement and enthusiasm has been contagious and remains as strong today as it was a year ago, even increasing as we near completion of the new entry and admissions areas. Join me in an armchair tour as we go to press in mid-August, and get a preview of what's to come.

Garden. The open metal work of the roof will allow vines to intertwine with the metal providing shade and elegance. Benches and a small water feature in the center of the arbor will offer visitors a comfortable and inviting place to gather or wait for a ride. The arbor is dedicated to all those who volunteer at the Garden.

### Agave terrace spiral

Beyond the entry arbor and over a bridge, the agave terrace spiral will be planted with agaves, the

symbol of the Garden. Hidden behind the spiral is the new admissions plaza which includes a donor wall, an information kiosk, and the new admissions booths.

### Admissions booths

Two admissions booths, each with two windows allowing for four cashiers, will shorten waiting lines to purchase tickets. The stacked stone walls compliment concrete columns which support a large canopy providing shade over the admissions area.

### Steele Entry Plaza

Garden visitors will pass through the graceful new entrance to enter the Steele Entry Plaza, a new gathering place in the Garden where anticipation builds for the sights hidden along Garden trails. Surrounding the plaza is the new Garden Shop for gifts and plants, the Visitor Services Center, the

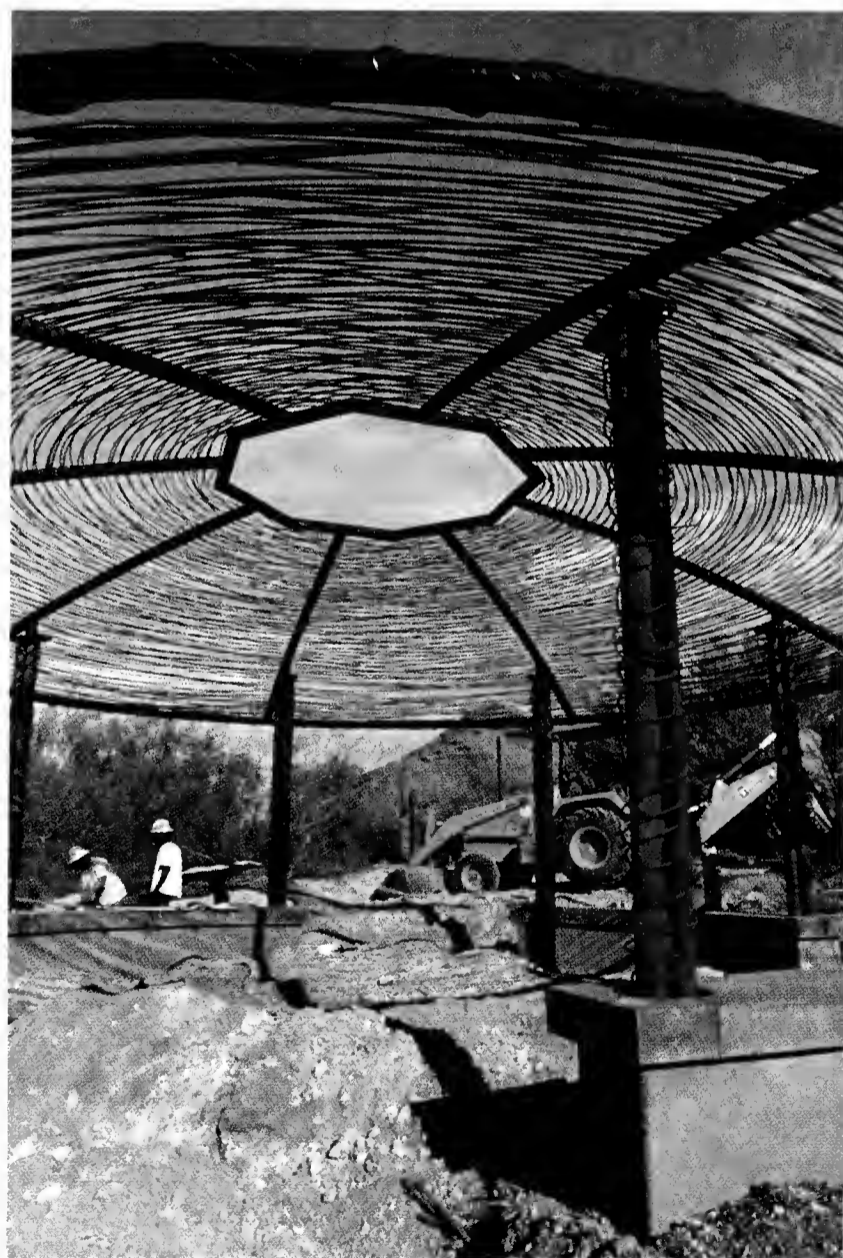
Harriet K. Maxwell Desert Wildflower Trail, and a dramatic downward spiral landscape feature.

Let's take a closer look . . .

### Visitor Services Center

(supported by SRP)

This attractive building is actually two buildings separated by a narrow breezeway. The new headquarters of the Garden, the visitor services center will offer comfort (restrooms and vending machines), a first-aid station, a rangers' office, and security station.



Schatt Entry Arbor

### Schatt Entry Arbor

The tour begins at the Schatt Entry Arbor. Designed by landscape architect Christy Ten Eyck, the entry arbor is the gateway to the



Garden Shop exterior

### Garden Shop, gifts and plants

This elegant and understated building will bring the gift and plant shops together under one roof. The exterior walls are finished in a beautiful stacked stonework complemented by copper rain gutters. The copper gutters extend from the roof to over the sidewalk, providing not only an interesting architectural feature but also directing rainwater to the sunken spiral garden. More about that in a moment. . .

The Garden Shop will greatly increase the space available for shopping in both the gift and plant shops. Separated by a glass wall and door, the shops will each be distinctive in feel. The gift shop has high windows in order to leave plenty of wall space for displaying merchandise. Offices, stock rooms, and a lounge are discreetly included in the building.

Much thought went into creating the new plant shop. The windows and skylights will admit plenty of sunshine. The floor, covered

# new facilities and improvements

Photos by Jennifer Johnston



Plant Shop interior

in a rich cocoa-brown colored brick, includes a draining system for runoff from watering the plants. Special "grow lights" will keep the plants healthy while they wait for new homes.

Just outside the Garden Shop is a relaxing plaza as guests leave the Garden. Visitors can sit in the shade of a large ironwood tree in Carolyn's Courtyard, a special space dedicated to our former executive director, Carolyn O'Malley. On the west side of the exit plaza is the dramatic sunken spiral garden.

Sunken spiral garden



Nina Mason Pulliam Research and Horticulture Center

## Sunken spiral

The sunken spiral garden holds a seep that receives runoff rain routed through a curving water-harvesting channel. Rain will run off the roof of the Garden Shop, pass through the copper gutters that extend from the roof, and cascade into the stone channel towards the spiral.

## Nina Mason Pulliam Research and Horticulture Center

The largest of the new buildings, the Nina Mason Pulliam Research and Horticulture Center will be the new home of the library, herbarium, horticulture, and research offices. This building will also include a conference room, volunteer lounge, and two laboratories.



Interior of the herbarium

The new facility will more than double the size of the herbarium and includes a large workspace for pressing and recording plants, several new cases for storage, and a "safe room" where newly collected specimens



Dorrance Hall

can be stored and decontaminated of bugs that could damage the collection.

#### **Dorrance Hall**

The elegant new reception hall, Dorrance Hall, will accommodate theater seating for four hundred and banquet seating for three hundred persons. Expected to be the most popular and beautiful rental facility in the Valley, this hall includes the lovely Kitchell Patio on the north side and the versatile Ottosen Gallery which will provide new indoor exhibit space, audio/visual room, and a large catering kitchen.

#### **Kemper and Ethel Marley Education and Volunteer Building**

The Kemper and Ethel Marley Education and Volunteer Building is where you will find the educational services offices and also the new headquarters for the Volunteers in the Garden. Offices, a large volunteer lounge, docent headquarters, a conference room, and a new teaching kitchen are contained in this new space.

#### **The Weisz Learning Center**

The Weisz Learning Center's two large, indoor classrooms and two large, outdoor classrooms are designed to enhance our educational programs and workshops. This is



Kemper and Ethel Marley Education and Volunteer Building

also the new home of the *Luminaria* office.

#### **Boppart Courtyard**

Central to all these buildings, in the heart of the Garden, is Boppart Courtyard. Still to be developed as of this writing, we can imagine a cool oasis shaded by tree canopies and the soothing sound of water trickling from the fountain. This is where Dorrance Hall revelers will gravitate and be reminded of why they would rather be at the Garden than anywhere else.

*Elaine McGinn is the Garden's exhibits coordinator and a project manager for the new construction.*

## **MEMBERS: Bring your membership card for admission**

When you arrive for your first visit to our beautiful new entrance this fall, you will find a few changes in our admission procedures. Here's what to expect.

Our new, state-of-the-art cashier/computer registers will keep track of our members' attendance. Each time you visit the Garden, admission staff will enter your membership number into the system. If your current membership card does not include a membership number, the admissions clerk will look it up and place that number on your card. This may take a few extra moments on your first visit to the new admissions booth.

If you arrive without your membership card, the clerk can do a quick look-up on the system to verify your status. You may be asked to provide identification. We will be happy to provide you with a new card if your membership card has been lost. You may ask the admissions clerk for one or call the membership office at 480/481-8144 several days in advance of your visit.

Turnstiles have been placed at each admissions booth. More than one booth will be open during periods of heavy traffic. Eventually we will designate one booth for our members' check in. It may take some time to work the "bugs" out of the system and we will appreciate your patience during this transition period. ☀

# Beautiful sites for events



Ullman Terrace set for a sunset supper.

The beautiful Desert Botanical Garden has been a popular site for meetings, retreats, parties, weddings, and receptions over the past fifteen years. New facilities opening in the spring of 2002 will offer additional spaces for events of various sizes.

These areas, each with unique qualities, are available for rent:

**Webster Auditorium** is an historic building, built in 1938, and an ideal location for meetings, retreats, dinner parties, and receptions. The building is available for daytime or evening events and includes the use of adjacent Eliot Patio, a quaint courtyard for cocktails, appetizers, and mingling. For evening events Ullman Terrace is added to Webster Auditorium and Eliot Patio, creating the Webster Center, a perfect location for weddings, outdoor dinner parties, and receptions. The backdrop for Ullman Terrace is the Garden Butte, which can be lighted to exhibit the beautiful plants even after dark. Trees on the Terrace are sprinkled with white lights, adding to the enchanting setting. This space is the most requested Garden site for weddings with fewer than 125 guests.

The **Binns Wildflower Pavilion** opened in the fall of 2000 and is nestled against the Harriet K. Maxwell Desert Wildflower trail. The open-air pavilion settles gently into the trail with magnificent views of the trail, Papago Buttes, and our lovely Arizona sunsets. The pavilion is perfect for dinner parties and weddings. An option available for wedding parties is to hold the ceremony in the Garden's nearby amphitheater and move to the pavilion for the reception. The capacity for the pavilion is 125, allowing room for a deejay and/or buffet tables. This location is quickly becoming a popular wedding site especially in the spring while the wildflowers are in bloom.

**Dorrance Hall and Boppart Courtyard**, opening in March 2002, are sure to be sought-after locations. Dorraance Hall will accommodate three hundred persons for a sit-down dinner, or four hundred in theater-style seating. Guests will enter through the beautiful lobby, Ottosen Gallery. Several sets of glass doors open onto Kitchell Patio on the north side of the hall and to a breezeway on the south side. Boppart Courtyard, south of Dorraance Hall, will provide an ideal setting for a cocktail party. The courtyard has a scenic dry

wash to the north and a running water feature to the south. Dorraance Hall will be a wonderful place to hold meetings with smaller break-out rooms nearby, or for a large social or corporate reception. Combined, Dorraance Hall and Boppart Courtyard will accommodate five hundred persons for an indoor/outdoor event.

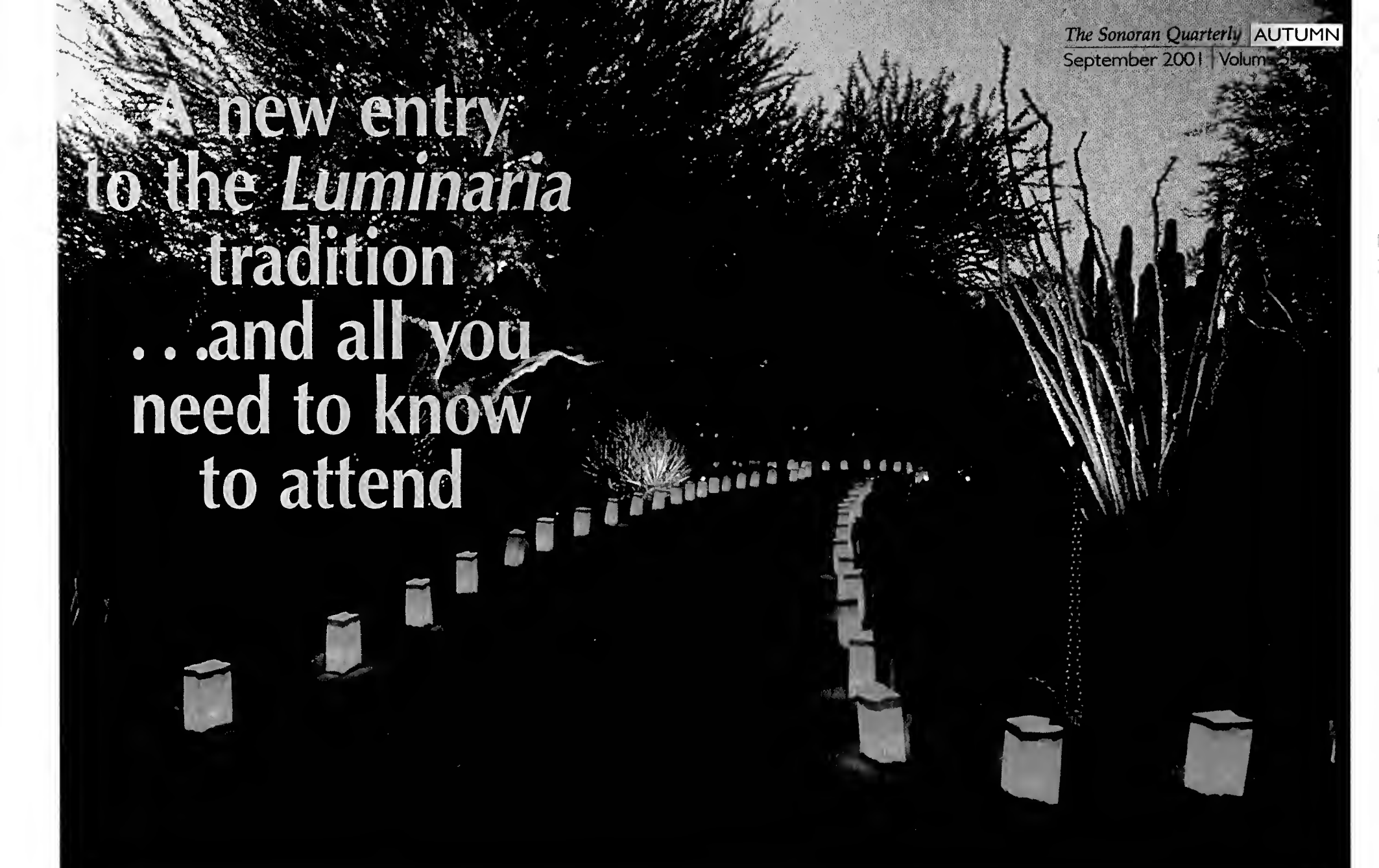
Smaller rooms are also available at the Garden for day or evening use, and are perfect for board retreats, meetings, team-building seminars, and small conferences. These include the two indoor **Weisz Learning Center** classrooms, opening in March 2002, which will accommodate up to fifty people each. The **Whiteman Conference Room** near Webster Auditorium, opening in June 2002, will also accommodate up to fifty people.

The Garden's well-experienced events staff is delighted to help planners arrange their event in the Garden. A facility rental packet is available, and guided tours, planting cactus dish gardens, and docent-interpreted touch carts are just a few of the creative activities the department can offer to enhance events.

Clients renting Garden facilities are asked to use one of the Garden's seven preferred caterers, each of whom has an outstanding reputation. Each catering company has served many events at the Garden and offers a wide variety of culinary styles as well as price ranges. The caterers are: Arcadia Farms Taste of the Desert, Santa Barbara Catering, The Barbecue Company, Fabulous Foods, Continental Catering, Events with Taste, and Arizona Taste. Contact information is available in the facility rental packet.

The events department recommends starting early to plan an event as many Garden facilities are booked months in advance. For information, please contact Marcia Bosio, events manager, at 480/481-8154, or check out our website at [www.dbg.org](http://www.dbg.org).

# A new entry to the *Luminaria* tradition ...and all you need to know to attend



Guests will see the Garden's new entryway lighted in the *Luminaria* tradition for the first time when they attend the 24th annual *Las Noches de las Luminarias*, to be held November 29 and 30 and December 1, from 5:30 to 9:30 p.m.

The traditional event is a must-do holiday activity for many Valley families and is hosted by the Volunteers in the Garden.

As usual, the first night of *Luminaria* is reserved for members and their guests to enjoy the seven thousand flowing luminarias along the Garden's pathways. Musical soloists and groups provide entertainment throughout the Garden. Complimentary cookies and hot cider are served in the "Cider Garden" behind the Desert House. Members and guests can enjoy a light meal in the food pavilion, where wine and beer are available.

## MEMBER TICKETS

Early in September Garden members will receive their members' invitation to purchase *Luminaria* tickets in the mail.

Members may purchase discounted tickets for any night **ONLY BY MAIL**. Orders must be postmarked by Saturday, October 6. Member-discounted ticket prices are: member adult, \$11;

member child (ages 5-12), \$3. Children under 5 are admitted free. Attendance is limited and no tickets are sold at the door.

Membership discounts are based on membership level. An individual Garden membership entitles that member to one adult ticket at the discounted price. At the family membership level and above, the number of discounted tickets is based on the number and ages of immediate family members actually residing in the household up to a maximum of four adult tickets.

## NON-MEMBER/GUEST TICKETS

Members can purchase an unlimited number of guest tickets at non-discounted prices: adults, \$14; and children (ages 5-12), \$4. Children under 5 are free.

## TICKET SALES TO THE PUBLIC

Tickets go on sale to the public on Monday, October 8, when orders may be placed by calling 480/481-8188, Monday through Friday, from 9 a.m. to 4 p.m. Phone orders are by **CREDIT CARD ONLY**. The price for members and non-members is the same: adults, \$14; and children (ages 5-12), \$4. Children under 5 are free.

Tickets are also available on the Garden website at [www.dbg.org](http://www.dbg.org) and in the Garden Shop.

Non-members may save their ticket stubs and present them for \$1-off admission to the Garden until February 28, 2002. In the case that rain cancels the event, tickets may be used for general admission to the Garden during 2002, except for *Luminaria* and other special events. The ticket price is equal to the fair market value of this event and is not deductible as a charitable contribution.

## PARKING

Parking is at the Phoenix municipal parking lot at Van Buren Street and Galvin Parkway/Priest Road. A free shuttle bus service transports attendees to and from the Garden. Members of the Saguaro Society, Curator's Circle, Director's Circle, and President's Club may park in the Garden's north parking lot. Persons with physical disabilities may park there with a handicap sticker or license plate.

## WOULD YOU LIKE AN INSIDER'S VIEW?

Chairs Maree Stone and Susan Ahearn need more than nine hundred volunteer workers and invite Garden members to help at the event. Positions range from cookie servers to parking lot attendants. Service groups are invited to inquire about helping before, after, or during the event. Please contact Peggy Moroney, recruiting chair, at 480/839-9064, or e-mail [moroney@asu.edu](mailto:moroney@asu.edu).

# Art in Bloom

## October art celebration continues to blossom; Family Day is new this year

By Marcia Bosio

**T**he Garden will host the 6th annual Art in Bloom on Saturday and Sunday, October 6 & 7.

The popular event will be held during two days for the first time this year. The Saturday premiere party will feature art and artists as well as fine food and beverages and a variety of musical entertainment along the Garden's beautiful trails. Art in Bloom continues on Sunday with a host of activities developed for families to enjoy.

Art in Bloom begins on Saturday from 4 to 8 p.m. when guests will stroll the Garden paths while admiring and purchasing art from forty-five of the finest regional artists. They will see wide variety in art styles, including watercolor and oil paintings, photography, quilts, fine jewelry, garden furniture and art, gourd crafts, sculptures, botanical illustrations, silk art, mosaic tiles, and ceramics.

Along the trails, culinary artists will provide complimentary samples of their cuisine. From Caribbean to Mexican to foods from the good ol' American South, there will be delectable flavors for nearly every palate. Wines, beers,

Art in Bloom means art for viewing and for sale along the Garden paths over two days this year for the first time.

margaritas, and other refreshing beverages will also be offered throughout the Garden.

Entertainment includes some of the area's best talent including Arizona Classic Dixieland Jazz Band, The Nitpickers (bluegrass), Trinidad Calypso (calypso), John Calvert (acoustic guitar), Steve Bodinet (folk), and New Wine (new age) as well as the Garden's own Director of Horticulture César Mazier and his friends playing Latin music.

A silent auction will be held in historic Webster Auditorium from 4 to 7 p.m. with items donated by many Art-in-Bloom artists as well as local restaurants, resorts, retail stores, and statewide attractions and entertainment. Local celebrities have been inspired to decorate festive garden hats and terra cotta pots also to be auctioned.

This premiere evening of Art in Bloom is a ticketed event, and all tickets must be purchased in advance at the Garden or by phone with a credit card at 480/941-1225. Tickets are \$45 per person and include admission, food and beverage samplings and entertainment. A no-host bar will also be available.

Art in Bloom Family Day, an addition to the event, will be held on Sunday from 8 a.m. to 5 p.m. The artists will return to display and sell their artwork to persons visiting the Garden that day.

Many family activities are planned through the day, including a special puppetry performance of *Hotel Saguaro* by the Great Arizona Puppet Theater from 10 to 11:30 a.m. in Webster Auditorium. Following will be a puppet-making activity for adults as well as children. Immediately after this activity will be a free concert on Ullman Terrace from 11:30 a.m. to 1 p.m. by The Top Cats, a local band combining swing, rock, and blues music styles guaranteed to get you on your feet. From 1 to 3 p.m., a "Colors of the Desert" make-it-and-take-it activity is planned for children and adults with botanical illustrator Catherine Sawner to provide guidance as they create their own watercolor art.

All Art in Bloom Family Day activities are



The opening, ticketed day of Art in Bloom will feature delicious food and beverages along the trail as well as upbeat music and an interesting silent auction.

included with admission or Garden membership. For additional information, please call 480/941-1225. ☀

*Marcia Bosio is events manager at the Desert Botanical Garden.*

## Music in the Garden

Five concerts have been booked for this year's Fall Music in the Garden series and the first two are free with Garden membership or admission. 11:30 a.m. to 1 p.m.

The Sunday lineup includes:

October 7 - The Top Cats, during Art in Bloom Family Day

October 14 - Robert Tree Cody (Dakota-Maricopa Tribe) and Xavier Quijas Yxayotl (Huichole Tribe) flute and percussion duet, during Native American Recognition Day

October 28 - Trinidad Calypso

November 4 - Turning Point

November 11 - Sistah Blue

Discounted season passes to the final three of the five-concert series are available at \$16 for Garden members and \$38.50 for non-members. Tickets will also be sold for each concert individually at \$6 for members and \$13.50 for non-members. Tickets: 480/941-1225.

The Garden's Music in the Garden and Jazz in the Garden concert series have been held for seven years. In that time, the series have seen much growth. This year the series will expand beyond the customary set of music groups and styles, bringing a greater variety of musical flavors to a wider audience.





# Clues from Mother Nature

By Patrick Quirk

*T*hose of us who prefer to, or must, garden with wild plants—that is, plants that have not been modified by selective breeding for garden use—are often confronted by the fact that there are no easy-to-follow recipes for success in growing wild plants. Here in the Southwest, many plants available to the desert landscaper are still unmodified from their wild heritage. Wild plants are undisciplined, unlike their cultivated cousins, and often present unique challenges. There are some solutions to this problem, both for this area as well as the rest of the country, where a few rebellious gardeners are prepared to try wild plants.

The absence of horticultural information about wild plants in this region can lead to a lot of confusion, frustration, and dead plants.

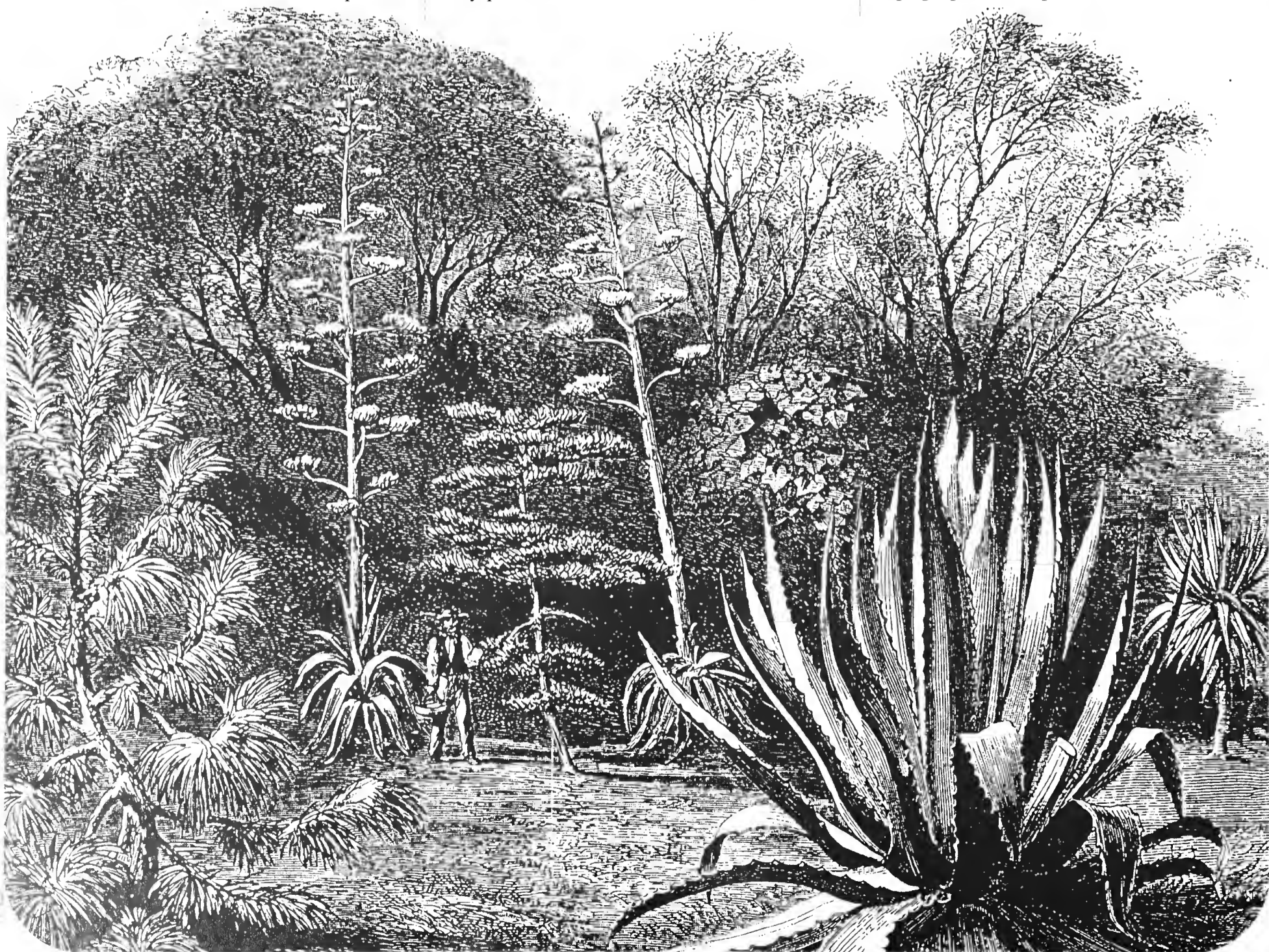
There is no better way to learn about any plant than to observe it in its natural habitat.

## **Read up before you pack up**

Before traveling, or as a second-best substitute if you simply cannot, there are a number of ways to find information about plants and their habitats. Among books, plant floras of your region of interest can tell you if a plant is present in an area, its associated species, and often other bits such as preferred altitude, vegetation types, and synonymous names it may have. Horticultural books, for example on cacti, penstemons, or oaks, can also help in providing photos of the plants in habitat, cultivation, and comments about a plant's preferences. Finally, travel books and guides may provide information about weather,

climate, topography, areas undisturbed by human activities, and travel conditions.

Even more important are maps, not only road or political maps, but also maps of climate, rainfall, vegetation, geology, and a host of other topics, all of which can deepen your understanding of conditions in any area. An atlas of the world can provide much of this information, especially regarding locations and topography. A thematic atlas can go into even more detail with specialized maps on almost any geographical factor anywhere in the world. These atlases are more complete regarding environmental details but aren't useful for travel. Finally, when in the field, geologic maps and topographical maps are useful—and



sometimes essential—in finding the plants and revealing if they prefer any specific strata or landforms. Soil and exposure preferences may be noted as well.

Another valuable resource is travelers' tales. From any traveler you can learn, through well constructed questions, a lot of personal anecdotes on the weather while he was there, the nature of the topography as it impressed him, conditions of travel and supply availabilities and other, more subtle observations. If the traveler is a plant person, so much the better, because you can ask more detailed questions about the local flora and get answers of greater utility.

### ***How to see a lot by looking***

All of the preceding is useful in deducing the general conditions prevalent in any area. Nevertheless, they are no substitute for direct, personal experience. This, and only this, can really show you, on your own terms and through your own manner of perception, how the plants that interest you arrange themselves in the wild and endure the climatic conditions prevalent there.

When you are in a field site, first note the overall ambience, how it impresses your senses. Be sensitive to the weather, imagine how it would be if you had to stay there forever—the plants do. Notice the topography; is it hilly, with many slopes and niches, or it is a plain with little variation in topography, or any combination thereof? Note the overall aspect of the vegetation, is it high and dense with a lot of shade or low and sparse, burning in the afternoon sun; is it continuous in its cover, evenly distributed, or discontinuous and clumped? All these factors are important in determining the available microclimates which plants can use.

After you make these observations it is time to narrow your view to the plants themselves and their placement in the landscape and their sizes and conditions. Only in the field

is it possible to see the full range of sizes in most types of plants. You can also see the normal, healthy appearances of the plants under natural conditions, both flush with health or bearing up under severe conditions. In this way you can design a planting with knowledge of the eventual size a plant may reach; you can learn the difference between a healthy but stressed plant and one that is sick—in the field you can see both and compare them. Gardeners are often unpleasantly surprised by a plant which grows much larger than anticipated, or they judge healthy plants to be sick because they look so different from greenhouse queens. By these observations from the field much grief can be avoided.

### ***Relate Nature's microclimates to your garden's***

Of all factors, the most important observation that you can make is how the plants are

distributed among various microclimates. Remember, what you see in the field are the survivors of Nature's lottery, many are germinated and few survive. Those that have survived are those which germinated in the right microclimate AND were lucky enough not to be eaten. So, if a plant is found in full sun most of the time, and the climate is like yours, don't plant it in deep shade. Contrarily, if a plant is always sheltered by other plants or rocks, place it in a similar situation. Note the soils which a plant favors. Note whether it grows on hillsides, watercourses, or flats. Note whether it prefers south or north exposure. In short, note all the microclimatic features you can think of and use this knowledge to guide you in placing this plant in your garden.

Be aware of the microclimates in your own garden. Know the cool and hot spots, the shady and sunny spots. If you are planting something from a climate like yours, use the pattern you saw in the field to guide its placement in your garden. If you are placing a plant from a climate dissimilar to yours, place it in a garden microclimate that comes closest to re-creating its natural conditions. For example, if a plant grows on a southwest exposure at a cool 7,000 feet in elevation, use a cool northeast exposure in your low-desert landscape.

In sum, be observant, be creative, and place your plants with the guidance of your field experience. Make your plants happy, because happy plants live. ■

*Patrick Quirk is the Garden's horticulturist in charge of cacti and a veteran of many field trips.*





# DBG a world leader in outdoor exhibits

**B**ecause of the demonstrated effectiveness of its signage and exhibits, the Desert Botanical Garden is used as a model for informal science education in outdoor settings by professionals throughout the world.

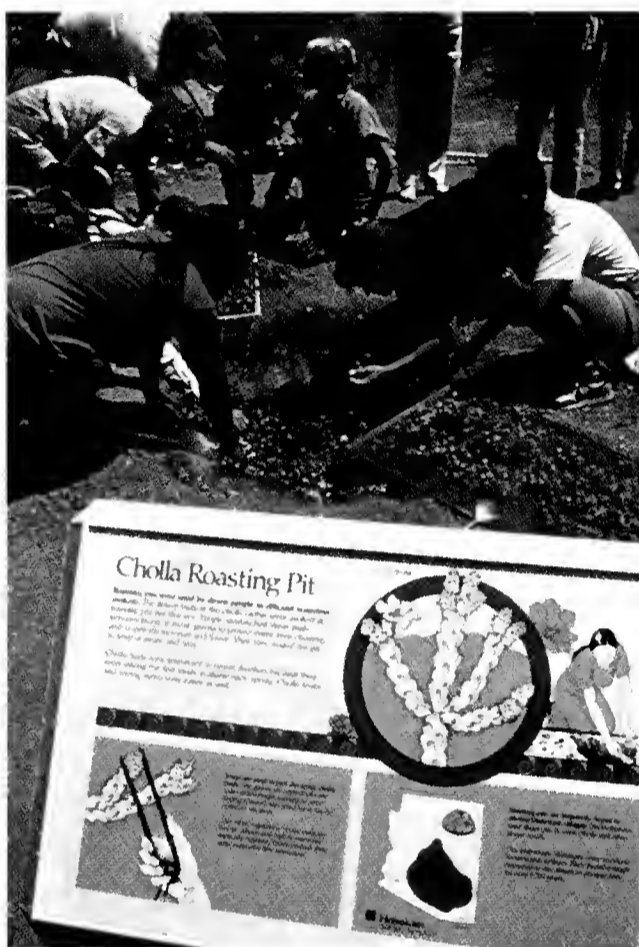
Representatives have visited from (among others) the Children's Environmental School in Latvia, the Royal Botanic Garden in Edinburgh, the Adelaide Botanic Garden in Australia, the Cambridge University Botanic Garden in England, the Missouri Botanical Garden in St. Louis, the Longwood Garden in Delaware, and the Huntington Botanic Garden in California.

Several photographs of Garden exhibits are included in a recent book, *Making Your Garden Come Alive: Environmental Interpretation in Botanical Gardens*. The author, Mary Koenig of South Africa, described the Garden as "a major source of inspiration and ideas."

In addition to sharing information with visitors from other gardens, Garden staff have been invited to make presentations at professional museum and botanical garden conferences from coast to coast, including the American Association of Botanical Gardens and Arboreta, Visitor Studies Association, and state and regional museum associations.

"We have not observed such enthusiasm and excitement from visitors for learning informal science at any (other) exhibit we have visited," wrote Dr. Stephen C. Bitgood, an internationally recognized museum evaluator, in his 1997 report about the Garden.

He was referring to the sixty then-new interactive exhibits on the Desert Discovery



Visitors collect cholla cactus buds on Plants and People of the Sonoran Desert trail, the Garden's first thematic loop trail, which opened in 1987.

trail, Sonoran Desert Nature trail, and Center for Desert Living trail that greatly enhance visitors' experiences at the Garden.

The exhibits, part of a project funded by the National Science Foundation, transformed the Garden's previous maze of trails and mosaic of unrelated plant beds (so typical of most botanical gardens) into an organized system of interpreted, themed trails. Our first thematic trail, Plants and People of the Sonoran Desert (opened in 1987), served as a model for the renovation, and the recently opened Harriet K. Maxwell Desert Wildflower trail became our fifth thematic trail.

Over the past fourteen years, staff from botanical gardens around the world have visited or contacted us to learn about our exhibits and unique visitor-centered, team approach to exhibit development. They are particularly interested in the fact that we don't hire exhibit companies to develop our exhibits. Instead, we use teams of staff, volunteers, and visitors for content development and pre-testing of exhibits, then refine the exhibits and finally use professional designers and artists for their fabrication. This in-house process ensures that exhibits attract visitors, hold their attention, and communicate important messages. ☀



Visitors learn about butterflies on the Harriet K. Maxwell Desert Wildflower trail, opened in 2001.

# Finding a thing in its absence

## The Secret Knowledge of Water: Discovering the Essence of the American Desert

by Craig Childs

304 pp. paperback, Boston: Little, Brown & Co., 2001, \$13.95

Craig Childs is a river guide, a field instructor in natural history, and a writer. He is that rarity we seldom find in Arizona, a native, born in the low-Sonoran desert.

Mr. Childs writes a complex tale. Spending years of his life in search of water in the desert, he concludes that the desert is nothing but water. Having walked more miles in the Southwest than most of us will ever see, he has an intimate knowledge of this land so defined by the presence and absence of water, from the ephemeral waters found in Cabeza Prieta to floods in the depths of the Grand Canyon. His work challenges a reader's perceptions of the desert.

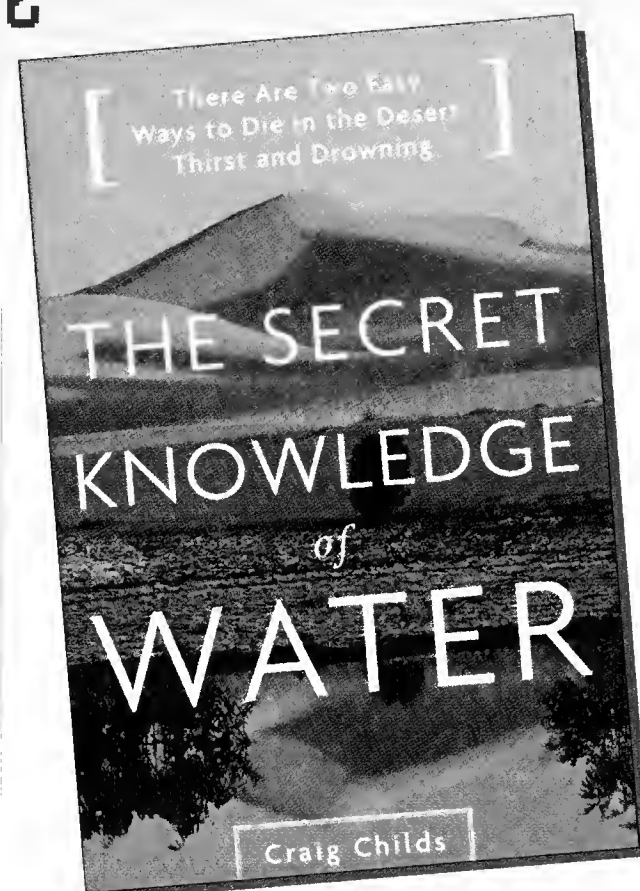
I am an armchair adventurer. Although I love the idea of nighttime strolls in pitch-black wilderness after a dinner of nothing but raisins and peanuts, I really don't want to leave my comfy couch or my microwave. I am thankful that Mr. Childs has provided me with a lyrical accounting of his own adventures. I enjoyed his prose immensely. I loved his description of a section of saguaros as "clumped together like old men waiting for a bus." His use of words is skillful and thought-provoking. He conjures images from the raw materials of irreverent pop culture to the spiritual anecdotes from various Native American tribes.

He talks about the magic of finding a *tinaja* (Spanish for earthen jar) filled with sixteen gallons of rainwater just days after it had been dry, when his own water supply had been raided and ruined by rodents. He describes the geological absurdity of finding a sandstone plain full of enormous waterpockets as noted by Major John Wesley Powell in 1870 and so named Thousand Wells. He tells a gripping tale of his harrowing climb up a slick rock wall to

escape an incoming flood. These are just a few of his tales.

By turn touching and then exciting, the stories in this book reflect the complexity of the relationship between water and the land. Mr. Childs speaks about the desert with reverence and respectful, sincere honesty. This was a fascinating book. I recommend it to anyone who is curious about water and its place in our arid land. \*

Reviewed by Jennifer Orf.



## WISH LIST

If you have an item to donate on the Wish List,  
please call the Garden at 480/481-8194

- Eight-foot fiberglass ladder
- 36-inch Water Wands
- Bookends
- Coffeemaker
- Digital camera
- Dish drainer
- Garden tools, small shovel, pruners
- Flatbed trailer
- Metal soil/kitchen scoops
- Plastic dishpans
- Stainless steel kitchen utensils
- Small microwave
- Small refrigerator
- Tupperware containers with lids
- Walk-behind trencher



Photo by César Mazier

The Garden's **Madagascar ocotillo** bloomed for the first time in its forty-five years here last May. The Garden received the fifteen-foot-tall *Alluaudia procera* from the University of California at Berkeley in 1956. It is native to Madagascar, an island in the Indian Ocean near southeast Africa.

The small, umbrella-type flowers in six-inch clusters were located at the very top of the plant. Small in size, they were nonetheless of monumental historical value to the Garden, said Cathy Babcock, assistant director of horticulture in charge of succulent plants. The plant is not related to our native ocotillo.

## Leadership named for 2002 grand opening

Board of Trustees President Martha Hunter has announced that Carol and Bob Bulla will co-chair the Garden's festivities opening the new facilities in 2002. The Bullas look forward to helping the Garden involve civic and business leaders, build visibility, and secure resources to produce an outstanding series of celebrations introducing the community to the results of our successful \$17 million capital campaign.

The Grand Opening program, now being planned, will include dedication ceremonies

# IN THE DESERT HOUSE

By Thom Hulen

The present residents of the Desert House, the Collins family, will complete their two-year residency this October. The next Desert House resident, and perhaps the last one to be monitored as part of the Desert House project, will be Ken Schutz, the Garden's executive director.

Desert House was built ten years ago with construction and landscaping technologies that maximize water and energy conservation. Data has been collected on the use of water and energy by residents of the Desert House.

The families who have lived in Desert House have been varied. They have included a family of two adults working away from home with a small child at daycare during weekdays, as well as a family of four with one adult working away from the home and a homemaker who worked at home caring for an infant and a first-grade

student. The current family was chosen because the Desert House partners wanted to see how a three-person family with a college-age resident used water and energy in the house. Ken Schutz will be the first single resident at the Desert House.

The Collins' energy- and water-use patterns are similar to the other Desert House families. They use far less water and power than do typical Phoenix area residents, about fifty percent less. On the average they use less than half the water and about twenty-five percent less energy than comparable houses in conventional neighborhoods.

When you get a chance, please wish the Collins family a fond farewell and welcome our new neighbor, Ken Schutz.

*Thom Hulen is Desert House coordinator at the Garden.*



Carol and Bob Bulla

and receptions for donors; previews for Garden members; events for Valley teachers, public officials and other special groups; and activities to attract local residents. The festivities will begin in mid-February, continue for ten weeks, culminating on May 11, Mother's Day.

## Native American Recognition Days— A mini-festival!

Join us on Sunday, October 14 as the Garden celebrates Native American Recognition Days (NARD). This annual event promotes Native American cultures through a month-long celebration of traditional and contemporary events.

This year, our celebration begins with a free concert from 11:30 a.m. until 1 p.m. with Robert Tree Cody (Dakota-Maricopa) and Xavier Quijas Yxayotl (Huichole) performing a flute and percussion duet on Ullman Terrace. From noon until 3 pm, demonstrations of the plant uses and traditions of Native Americans of the Sonoran Desert will be held on the Plants and People of the Sonoran Desert trail.

The concert is sponsored by Canyon Records. Trail presentations sponsored by Drumbeat Indian Art and Arcadia Farms.

All events are included with membership or admission. For more information, log onto [www.dbg.org](http://www.dbg.org) or call 480/941-1225.

## New member tours rated "wonderful"

The Garden will continue behind-the-scenes tours for new members after the initial event in May was warmly received by 136 new Garden members. Eighty percent of the group rated the experience as "wonderful."

After refreshments in the Binns Wildflower Pavilion, docents led the tours through Garden sites not usually seen by the public, and key staff members gave presentations and answered questions. Comments included:

"The tour was terrific."

"Our guide was fabulous!"

"The volunteers and staff spoke with such enthusiasm about the Garden."

"I'm amazed by the world status of this botanical garden."

"Now we understand the depth of intense work that goes on behind the plants."

"I learned many things and hope to continue learning by coming back."

For information about the next tour on September 22, call 480/481-8179.

## Fall Plant Sale Festival

Mark your calendars for the Fall Plant Sale Festival on October 19, 20 & 21. The festival features 25,000 desert-adapted plants in one location, including large and small cacti and succulents; agaves, yuccas, hesperaloes and nolinias; trees and shrubs; herbaceous perennials and more!

Throughout the Festival, pruning, cactus care and other clinics will be held; books and garden art will be available; and you'll receive planting and growing advice from Garden horticulturists.

On Thursday, October 18, a plant sale preview will be held for Saguaro Society, Curator's Circle, Director's Circle and President's Club members.

The Members Only Sale is Friday, October 19 from 9 a.m. to 6 p.m. and Saturday, October 20 from 8 to 9 a.m. The Festival is open to the general public on Saturday and Sunday, October 20 & 21 from 9 a.m. to 5 p.m. For more information, call 480/941-1225 or check out the Garden's website at [www.dbg.org](http://www.dbg.org).

The plant sale festival is sponsored, in part, by *Phoenix Home and Garden* magazine.



Pictured are Saguaro Committee Co-chair Rose Papp and Chair Melodie Lewis.

## Saguaro Committee invites new members

Invitations to special tours and events are just one of the membership benefits for the Saguaro Society. These activities would not be possible without volunteer support from the twelve-member Saguaro Committee. From the popular spring home and garden tour to excursions to other botanical institutions, the Saguaro Committee plans and coordinates special events for Saguaro Society members throughout the year.

New committee members are welcome! For more information, contact Beverly Duzik, development director, at 480/481-8111.

## Wendy's book is nominated

Wendy Hodgson's book, *Food Plants of the Sonoran Desert*, has been nominated for the prestigious Klinger Award, given annually since 1995 by the Society for Economic Botany to the year's outstanding book published on the general topic of economic botany. The winner will be announced in June and will receive an award of \$250.

Dr. Dan Austin, review editor for the Society's journal, "Economic Botany," and chair of the Klinger Award committee, said the book was nominated on the basis of its synthesis of content and Wendy's firsthand contributions to the body of knowledge

about the use of native Southwestern food plants.

The Society, established in 1946, brings together people with interests in the ways people and plants interact. It has about a thousand members throughout the world, including botanists, zoologists, anthropologists, archaeologists, ecologists, and others.

*Food Plants of the Sonoran Desert* was published this past spring by the University of Arizona Press. Wendy is a senior research botanist at the Desert Botanical Garden where she is curator of the Earle Herbarium.



*The Desert Botanical Garden is grateful for the support of all 9,762 members. Recognized here are members of the President's Club, Director's Circle, Curator's Circle, Saguaro Society, and The Sonoran Circle. Also listed are donations and memberships received from April 1 to June 30, 2001, for Ocotillo Club, Boojum Club, Agave Century Club, and Desert Council.*

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Mary & Harry J. Young  
Beth & David Zeibig

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*The Desert Botanical Garden is honored to acknowledge the following individuals who have included the Garden in their estate plans.*

Anonymous (18)  
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Gail & John Allan  
Sidney Allen  
Lou Ella Archer \*  
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Alice Feffer \*  
Donna & Mark Feldman  
Elaine & Dan Gruber

Have you provided for the Desert Botanical Garden in your will or estate plans? If so, you may qualify for membership in The Sonoran Circle. For more information call Beverly Duzik, director of development, at 480/481-8111.

Desert Willow (\$500 +)  
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*A corporate membership category, Desert Council represents an alliance between the Desert Botanical Garden & the business community for donors of \$250 or more.*

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*in memory of Vi Cody*  
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*in memory of Horace William Lundberg*  
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*in honor of John Cusack*

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Ruth Grossman,  
*in memory of Jennifer Gritton*  
Carol & Edward Hall,  
*in honor of Clark Rose*  
Dave Hughes,  
*in memory of Bessie Kate Baldwin*  
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The Sonoran Quarterly **AUTUMN**  
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Please see the  
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# THE SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona December 2001/Volume 55, No. 4



# A Compelling Attraction

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## THE SONORAN QUARTERLY

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**M**ore than sixty years ago, at the dedication of the Garden in 1939, founder Gertrude Divine Webster said this:

*Our purpose is threefold. We wish to conserve our Arizona desert flora, fast being destroyed. We wish to establish scientific plantings for students and botanists. We wish to make a compelling attraction for winter visitors.*

Generations later, Mrs. Webster's words still ring true. In fact, the goals she laid out in 1939 have guided the Garden through each stage of its development, and they continue to direct our programs and exhibits today.

In its earliest years the Garden focused on the first of Mrs. Webster's goals—the conservation of desert plants. From the beginning, Garden staff and volunteers have actively collected and propagated a rich variety of desert and arid-land plants for display. Today the Garden's holdings include more than forty-five thousand living plant specimens, and its vast collection of cacti is widely recognized as the finest in the world.

In its middle years and continuing to the present, the Garden placed an equal focus on Mrs. Webster's second goal—scientific plantings and the research and educational opportunities associated with them. Once the Garden's living collection was firmly established, staff and volunteers began to create exhibits that highlighted the unique adaptations of plants to the desert, affording opportunity for botanists and other researchers to study those adaptations. That work continues today, and the Garden's exhibits, library, and herbarium, as well as the publications of its resident scientists



Photograph by Jennifer Johnston

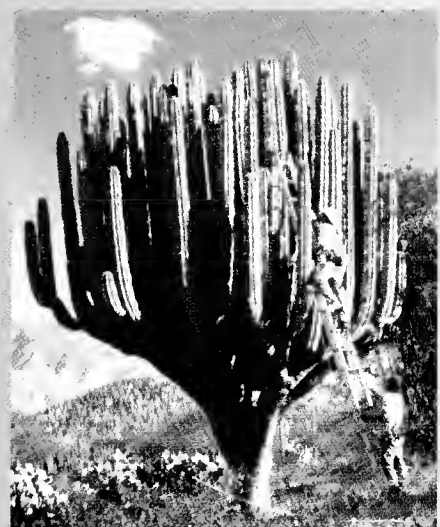
Ken Schutz

serve as vital research tools for botanists around the world.

Now, at the dawn of a new phase in our history, with more than \$17 million in capital improvements slated to open in just a couple of months, the Desert Botanical Garden stands ready to fully achieve Mrs. Webster's third goal, that of becoming a compelling attraction for visitors to enjoy. Our staff and volunteers have planned a spring season packed full of exciting new exhibits and experiences—including the live Butterfly Garden and the Big Bugs exhibit described in this issue of the *Quarterly* that have proven so popular at other gardens around the country.

We want the 2002 spring season to be the Garden's best ever in terms of both the quality of the visit for each guest as well as the total number of visitors we serve. We look forward to welcoming you to all our new exhibits and facilities in February, and ask that you help us spread the word about Arizona's newest compelling attraction—the Desert Botanical Garden! 🌵

Ken Schutz  
the Dr. William Huizingh executive director



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## ON OUR COVER

Dr. Joe McAuliffe, research ecologist at the Desert Botanical Garden (on the ladder), and co-worker Paul Hendricks examine one of the giant cacti (*Pachycereus weberi*) in the Tehuacán Valley in south-central Mexico. Dr. McAuliffe studies soil and writes about the effects of farming in this issue of *The Sonoran Quarterly*.

Photograph by Joe McAuliffe



# Lessons from the Past: Soil

Article and photographs by Joe McAuliffe, Ph.D.

In the end,  
We will conserve only  
what we love,  
We will love only what  
we know  
And we will know only  
what we are taught.

Baba Diom, Senegal

We take soil for granted. We often, mistakenly, call it "dirt," which is misplaced soil (think of your dirty shirt collar after a morning's work in the garden). Soil is a marvelous amalgam of mineral and organic matter, water, and air that is churned, mixed, and chemically modified by physical processes and biological activity. Remember the old guessing game "Animal, Vegetable, or Mineral"? Soil is the only thing I know that is all three. This wonderful mixture provides the foundation for all terrestrial life, including humankind.

Soil's importance to humanity extends far beyond simple biological sustenance. Great civilizations arose because people learned to farm—to plant seeds and cultivate food plants, transforming highly mobile hunter-gatherers into beings who could live in one place and depend on a reliable bounty of food. This produced, after thousands of years, dense cultures of art, government, writing, science, education, and technology. The innovation of agriculture clearly is the original technological foundation upon which the complex edifice of specialized occupations and tremendous human achievement has been erected.

We have never left the agricultural age, however. Quite simply, we can't. We all require the sustenance that comes from the productive capacity of the soil. Indeed,

participants of our current "Information Age" are actually far more dependent on agriculture's harnessing of the soil's potential than were the first farmers thousands of years ago because today most of us rely on food grown by someone else.

Today, less than three percent of the United States labor force is directly involved in agricultural production. It is an amazing technological achievement that this tiny minority can produce enough food to feed the nation, with surplus left over for export. The rest of us, the vast majority, are free to purchase and consume this bounty, though we have largely lost touch with how, when, or where it was produced.

This lost connection is tragic and more than simple nostalgia for the old-time family farm. We consumers are also separated from knowing about the health of the land where our food is produced. How much does the average person really know about how certain products and practices may or may not damage the soil, affecting its ability to feed future generations? Wendell Berry writes, "The

consumer withdraws from the problems of food production and becomes scornful of them—consumers participate innocently or ignorantly in farm waste. . . . They may be using and abusing more land by proxy than they are conserving by intervention of their organizations."

Erosion of agricultural soils is a serious global problem. Erosion occurs when a protective plant cover is removed and the underlying soil is exposed to the direct impact of raindrops, flowing water, or wind. The magnitude of soil erosion in the United States alone is staggering. About ninety percent of our croplands are losing soil faster than the rate at which it can be re-formed. Half of the fertile topsoil in the Iowa corn belt has been lost in the last 150 years of farming. The wheat-growing regions of eastern Washington have lost about half their fertile topsoils since 1900. In many places in the United States, agricultural soils are being lost at a rate estimated to be about seventeen times greater than the rate at which they were originally formed. Problems of soil erosion in many developing countries are



Unnecessary soil erosion is tragic and occurs in our own backyards. This is severe erosion in a soybean field in southeastern Nebraska in 1996.

# Erosion, Plants, and People

far worse. Much of this erosion could be avoided with common, well-known soil conservation measures and farming techniques.

A nation that  
destroys its soils,  
destroys itself.

Franklin D. Roosevelt, 1937

Humanity today is increasingly dependent on a shrinking soil resource. To feed people a varied and nutritious diet requires about 1.2 acres of cultivated land per person, yet, alarmingly, only about half that amount (0.67 acres) is available in the world today. In this light, any loss or damage to soils is a tragedy. Globally, nearly thirty million acres (about 47,000 square miles) of cultivated land are annually destroyed and abandoned because of poor farming practices. This represents a loss of about 0.8 percent per year of all the cultivated land in the world. Within forty years of continued soil losses and population growth, there will only be about one third of an acre of cultivated land per person for the production of crops for food.

The harm caused by soil erosion is geographically far-reaching and persists for a long, long time. Wherever there is soil erosion, somewhere downstream, a river, reservoir, or estuary is clogged with sediment or polluted with fertilizers and pesticides which cling to soil particles. For example, in the northern Gulf of Mexico, a growing "dead zone" of oxygen-depleted water has been blamed largely on runoff from farmlands in America's heartland, delivered to the Gulf by the Mississippi River.

In Arizona, the nation's highest levels of DDT contamination from farmland

runoff still taint the waters of the Gila River downstream from Phoenix nearly thirty years after the pesticide was banned in the U.S. This deadly pesticide continues to wash from thousands of acres of farmland in the Phoenix valley that were heavily treated in the 1950s and 1960s in an attempt to wipe out pink bollworm infestations in cotton. DDT concentrations in fish from the river have been measured as much as seventy times the federal health limit for human consumption. To this day, state and federal government agencies advise against eating fish from this part of the Gila River.

Another tragic story of soil erosion in the American Southwest involves soil loss due to poor range management. In both Arizona and New Mexico, damage to soils in many desert grasslands has caused undesirable vegetation changes that have persisted in some cases for more than a century. (See *The Sonoran Quarterly*, Fall 1993/Vol. 47, No. 3)

My research in the Tehuacán Valley of south-central Mexico has made me keenly aware of how far-reaching and persistent the detrimental environmental and social impacts of soil erosion can be. This small valley (one hundred miles long and twenty-five miles wide), located about 120 miles southeast of Mexico City, is one of the biologically richest semi-arid regions in the world and contains a tremendously diverse flora. Nearly sixty species of cacti are found there, several as large as or larger than the saguaro (*Carnegiea gigantea*) of the Sonoran Desert.



Dr. McAuliffe and co-worker Paul Hendricks studying one of the giant cacti (*Pachycereus weberi*) in the Tehuacán Valley.

There are also abundant agaves, yuccas, many species of small arid-adapted trees such as the palo-brea (*Cercidium praecox*), copal (*Bursera* spp.), and tree ocotillo (*Fouquieria formosa*) and shrubs such as the white-thorn (*Acacia constricta*). In many ways, the natural vegetation of the Tehuacán Valley resembles that of the most moist portions of the Sonoran Desert.

The Tehuacán Valley has a rich agricultural history. Archaeological studies in the valley have found remains of corn

(maize) that are 4,700 years old. Corn was first domesticated in southern Mexico, and the Tehuacán Valley was likely one of the first places it was grown by pre-Columbian farmers. A succession of



A mural in the city of Tehuacán depicting the planting of corn by an early American.

advanced agricultural societies flourished in this valley for several thousand years before the Spanish Conquest in 1521. These societies developed sophisticated irrigation systems and also relied on summer rains to grow crops of beans, corn, and squash. Today, almost everywhere on the valley floor and across gentle hillslopes, you can find the archaeological remains of these pre-Columbian farming efforts—irrigation canals, dams, terraces, and stone borders edging ancient, abandoned fields.

My colleagues and I have studied the rural village of Los Reyes Metzontla, an ancient settlement of five thousand inhabitants established in pre-Columbian times. Most families in this rural agricultural collective cultivate rather steep hillslope fields and depend entirely on the rainfall in the summer months to grow corn and beans. Our surveys of the lands surrounding the village showed that almost all the hillslope soils were severely

eroded. In most fields, the thin soils underlain by bedrock were no more than eight inches (20 cm) deep. Comparison of these eroded soils with those of nearby hillslopes that have escaped cultivation indicated that at least one-and-a-half feet (0.5 m) of soil has been lost to erosion in many of the fields.



View of intensely farmed, steep and eroded hillslope fields near Los Reyes Metzontla.



Closeup of extreme erosion and thin, unproductive soil in a field near Los Reyes Metzontla.

Our first inclination was to blame this extreme erosion on use of the landscape in recent historical times. Further investigation, however, proved otherwise. Recent channel cutting through layered floodplain deposits in the flat valley floor six miles downstream from the village provided an open history book of when and where erosion occurred. This history book contained several different "pages" consisting of different layers. Some of the layers contained fragments of wood charcoal, which we used to establish the age of each deposit with carbon-14 dating. The thickest, middle



Dr. McAuliffe examines the exposed channel wall in the floodplain in the lower valley. The thick, middle, reddish layer consists largely of soils eroded from the region around Los Reyes Metzontla approximately a thousand years ago. The ladder, made on the spot from the old, dried flower stalks of agaves, was used to sample the layers and collect the charcoal samples.

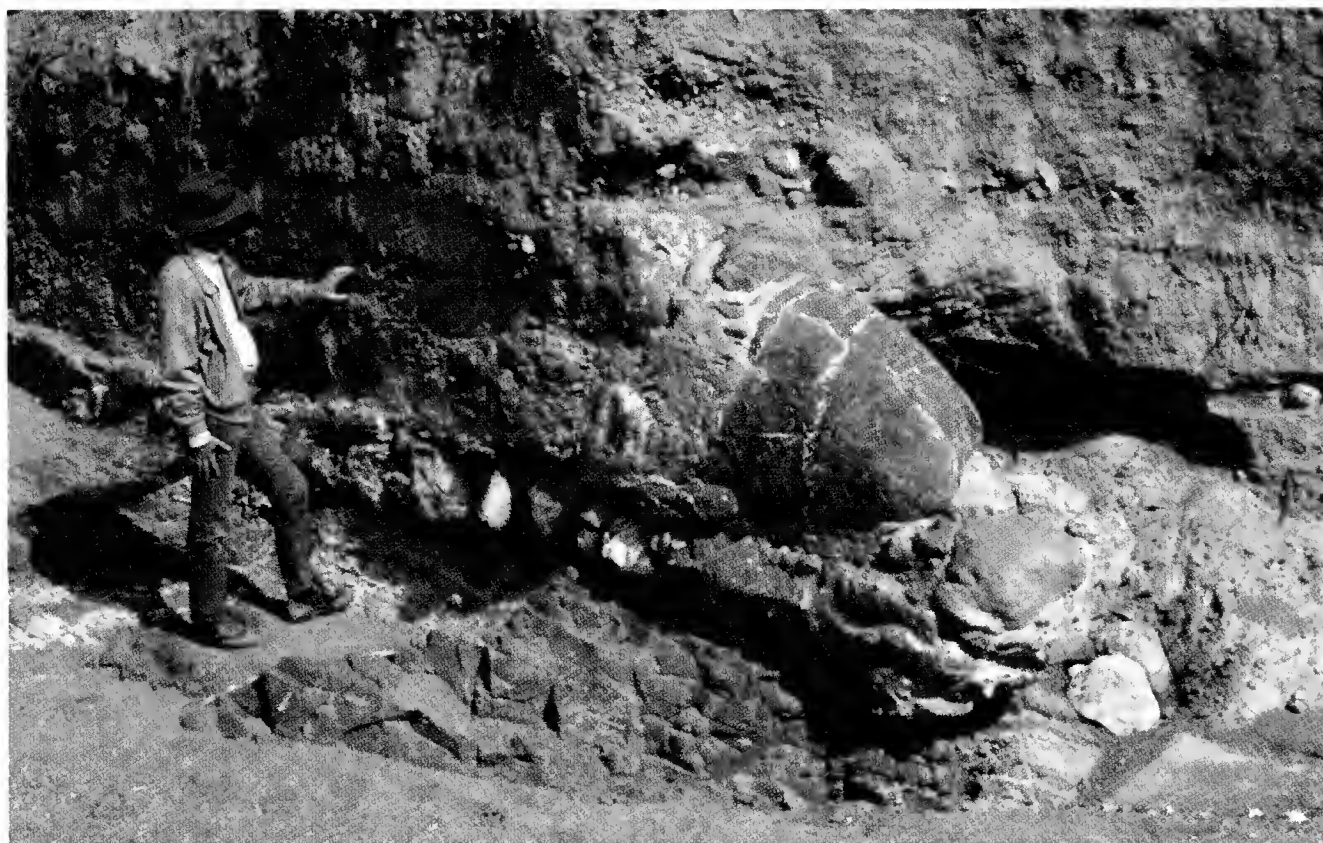
layer was a distinct reddish-brown, the same color as the unique, clay-rich soils used for farming in the area immediately surrounding Los Reyes Metzontla. The occurrence of this distinct reddish layer indicated that at some time in the past, the clayey, reddish farmland around Metzontla had eroded much more than did other non-agricultural soils (typically buff-colored) comprising the rest of the drainage basin. Dating of charcoal indicated the reddish layer was deposited between nine hundred and a thousand years ago. According to archaeological studies, this is only a few hundred years after people in the Tehuacán Valley first began to widely

cultivate crops on hillslopes. Before that time, farming had principally been confined to relatively level, irrigated valley floors. Archaeological studies also indicate that the entire Tehuacán Valley experienced tremendous population growth at this time. This ancient population boom may actually be one of the reasons why people began to use marginally suitable areas of hillslopes for farming.

Other information contained with the thick, reddish-brown layer provided additional evidence that farming practices nearly a thousand years ago were principally responsible for the original episode of severe soil erosion around Los Reyes Metzontla. The deposit contained abundant, pinhead-sized pieces of charcoal, as well as occasional burned remains of larger woody plant parts. Slash-and-burn clearing by the original pre-Columbian farmers is the likely source of the abundant charcoal. Both the charcoal produced by the burning and the exposed hillslope soils were then carried downstream by the erosive action of water. The most serious soil erosion probably came soon after the slopes were first cleared and farming began.

This severe soil erosion no doubt quickly and adversely affected those people whose subsistence depended on agricultural production from the hillslopes around Metzontla. Furthermore, the harm reached far beyond the immediate location of the village. The tremendous amount of sediments washed and deposited downstream eventually buried massive stone and mortar canals on the distant valley floor that were used to irrigate the inherently more productive valleys. The agricultural expansion a thousand years ago to include marginal hillslope environments may have initially provided additional food required by a rapidly growing population, but unfortunately this expansion probably became counterproductive by damaging the irrigation system for the far more productive valley floor located downstream.

The severe erosion of long ago has impover-



Dr. Robert Breunig, former director of the Desert Botanical Garden, examines pre-Columbian irrigation canal that was completely buried by sediments derived from the soils eroded around Los Reyes Metzontla.

ished the landscape around Los Reyes Metzontla to this day. Human hardship and hunger are commonplace in the village and many others like it in Mexico because the local fields cannot produce enough to feed the inhabitants. Despite many attempts, residents cannot cultivate enough land to meet even subsistence requirements due to the impoverished, eroded soils and corresponding extremely poor crop yields. Many people of the village consequently have gone elsewhere to make a living, including large urban centers in Mexico and the United States. In a real sense, the citizens of the United States are directly affected by soil erosion that occurred 1,400 miles to the south, a thousand years ago.

The ecological, economic, and social consequences of soil erosion are serious issues that must be dealt with in all parts of the globe, including arid and semi-arid regions. Continued population growth increasingly taxes the capacity of the world's soils to produce food, fiber, and wood necessary for human well-being. Without sustainable use of the world's soils, we jeopardize the well-being of future generations. Soil is an

irreplaceable ecological endowment. Wasteful or careless use of it robs future generations of the basic agricultural wealth upon which they will depend.

*Joe McAuliffe, Ph.D., is a research ecologist at the Desert Botanical Garden.*

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# True Life Adventures of a Home Gardener

Article and photographs by Cathy Babcock

I am a horticulturist. I am not a botanist although I know basic botany. I am not a landscape designer although I know basic design principles. I do, however, have a passion for plants which, perhaps unfortunately, shows in my home landscape. My yard is not a design but a conglomeration of plants which I like—one of this here and one of that over there.

When I bought the house ten years ago the front and back yards were nothing but Bermuda grass with no trees except one mulberry and one arbor-vitae in the front. I started in the front yard, digging the ubiquitous trench which people in this area call a "river run." It looks nothing like a creek bed, but it does funnel rainwater away from the house. That was accidental but it turned out to be a good thing.

Then I planted shade for my future aloe and future echinopsis beds. I naively



Mixed plantings

chose an ironwood—a beautiful tree but extraordinarily slow growing—to shade the cactus bed. Luckily an existing *Datura* plant offered some shade for the poor cacti, so I planted them anyway. The aloe bed never materialized because the first tree I planted there—a *Lysiloma*—did not do well. Two trees later I still have no shade on the spot and the most recent attempt seems to have frozen last winter. Everything else in the front yard has grown like crazy, however; the lot was once a dairy farm and the soil is nice and fairly fertile.

Eventually I made the aloe bed on the side of the house, much bigger than originally planned and more spectacular for it. In fact, that area started out so well that I planted the entire side yard with various succulents.

Then to the back yard. In this neighborhood my desert-style landscaping is an anomaly. Most of the yards have Bermuda grass, and it is a nightmare trying to keep the grass

out of my yard. I have had to be rigorously vigilant and my main weapon has been glyphosate. You can be as organic as you like, but in my experienced opinion the only successful method for Bermuda is with herbicide.

The original plans for the back yard included a pond, a butterfly/hummingbird garden, and a fruit orchard. I now have a hole in the ground which I call a pond. It supports some mosquito fish, water iris, and water hyacinth. There was a turtle, but she crept away. The orchard consisted of an apricot, a peach, and a nectarine, all three of which have also left to meet their maker. The butterfly/hummingbird garden was overtaken by grass, as was the rest of the yard. The only smart thing I did was to plant several trees which are now big and beautiful and provide wonderful filtered shade.

With persistence, however, I cleaned up the back yard and de-grassed it, removing



*Pachycormus discolor*



Aloe beds

what was left of the hummingbird garden and moving my collection of potted plants to the back side of the house. I then planted the back yard in succulents and small perennials and shrubs. I must be honest here: It is really beginning to look good. I held my first Open Garden this spring, for my friends in the Central Arizona Cactus and Succulent Society.

I tried a vegetable garden, but it was too high-maintenance for a succulent enthusiast.



Mixed plantings

It lasted only one season and now is my future mammillaria bed, although two tomato plants struggle on, reluctant to abandon their own hopes.

I have plants purchased two plant sales ago which I have yet to get into the ground. Every plant sale brings something new that I feel I must have and of course, there are my semi-annual forays to California for more succulents (mostly aloes).

When friends visit for the first time, they recognize my house without knowing the address. Years ago when former Garden Director Robert Breunig was visiting his daughter who lived down the street from me, they walked downtown for breakfast one morning. As they passed my house, Robert remarked to his daughter that "it looks like someone from the botanic garden lives there." On their way back he saw me through the kitchen window and called out, delighted that his observation was indeed right on target.

I will never be done in my garden. There are always new plants to try and blank areas of the yard to fill in. This is my joy in gardening. •

*Cathy Babcock is a horticulturist and is assistant director of horticulture at the Desert Botanical Garden.*

## Our thanks to Gertrude Divine Webster... and You!

The winter holiday season is a wonderful time to remember Gertrude Divine Webster, our remarkable founder. Without her vision, generosity, and love of Arizona's unique flora, the Desert Botanical Garden and its historic plant collection would not exist today.

Since the Garden's dedication in 1939, thousands of individuals have helped sustain Mrs. Webster's vision and realize her goals for the institution. As a valued member of Desert Botanical Garden, you are one of those important individuals helping to conserve Arizona's desert flora, maintain a world-renown plant collection, and provide a "compelling attraction" for the community.

In your November mail you received the Garden's autumn appeal for support above and beyond your membership. Please keep in mind that memberships provide sixteen percent of the Garden's budget. Twenty-one percent of the Garden's operational support comes from contributions from foundations, corporations, and members. The Garden needs and depends upon *your* support.

The Desert Botanical Garden extends sincere thanks for your continued support, and we wish you and your family a healthy and happy holiday season!

# *The Year of the Bug*

## *Live butterflies and giant insect sculptures will be featured at Garden in 2002*

**A**s part of the Grand Opening celebration to be held next spring, the Desert Botanical Garden has scheduled two special exhibits.

The first is a walk-through butterfly habitat—with as many as one thousand live butterflies at a time—in a spacious 36- by 80-foot flight enclosure. Visitors will be able to stroll through this exhibit as the butterflies flutter by, stopping to feed, drink, and rest in the lushly planted garden beds that are the backbone of this exhibit which is named, appropriately enough, Spineless Wonders.



Butterfly habitat

The butterfly exhibit will also feature an emergence chamber where patient visitors can witness the process by which adult butterflies emerge from their chrysalids (cocoons) after a period of metamorphosis. All the butterflies on display at the Garden will be species indigenous to North America, and many can be found in Arizona.

The butterfly photos accompanying this article were taken at the Spineless Wonders exhibit this summer at the Santa Barbara Museum of Natural History.



Butterfly  
photographs  
by Ken Schutz

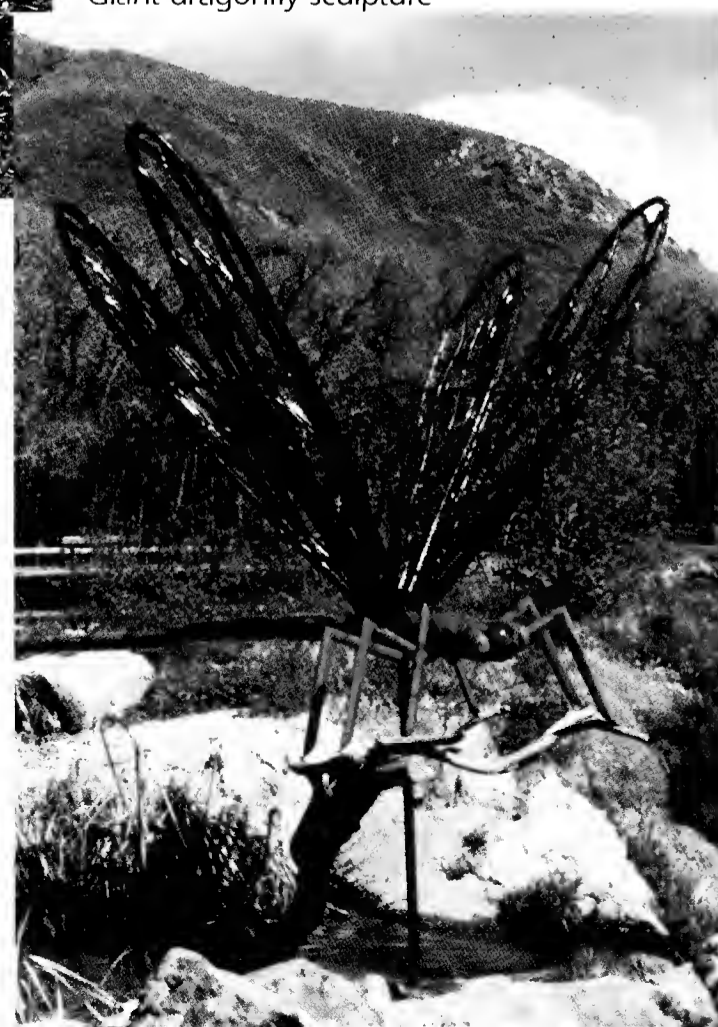
Monarch butterflies

The Spineless Wonders and Big Bugs exhibits will be open to the public on Saturday, February 23, and continue through Sunday, May 12, 2002. A members' preview of both exhibits will be held on Saturday and Sunday, February 16 and 17, 2002. Invitations will be sent to all members.

Giant dragonfly sculpture



Zebra butterfly





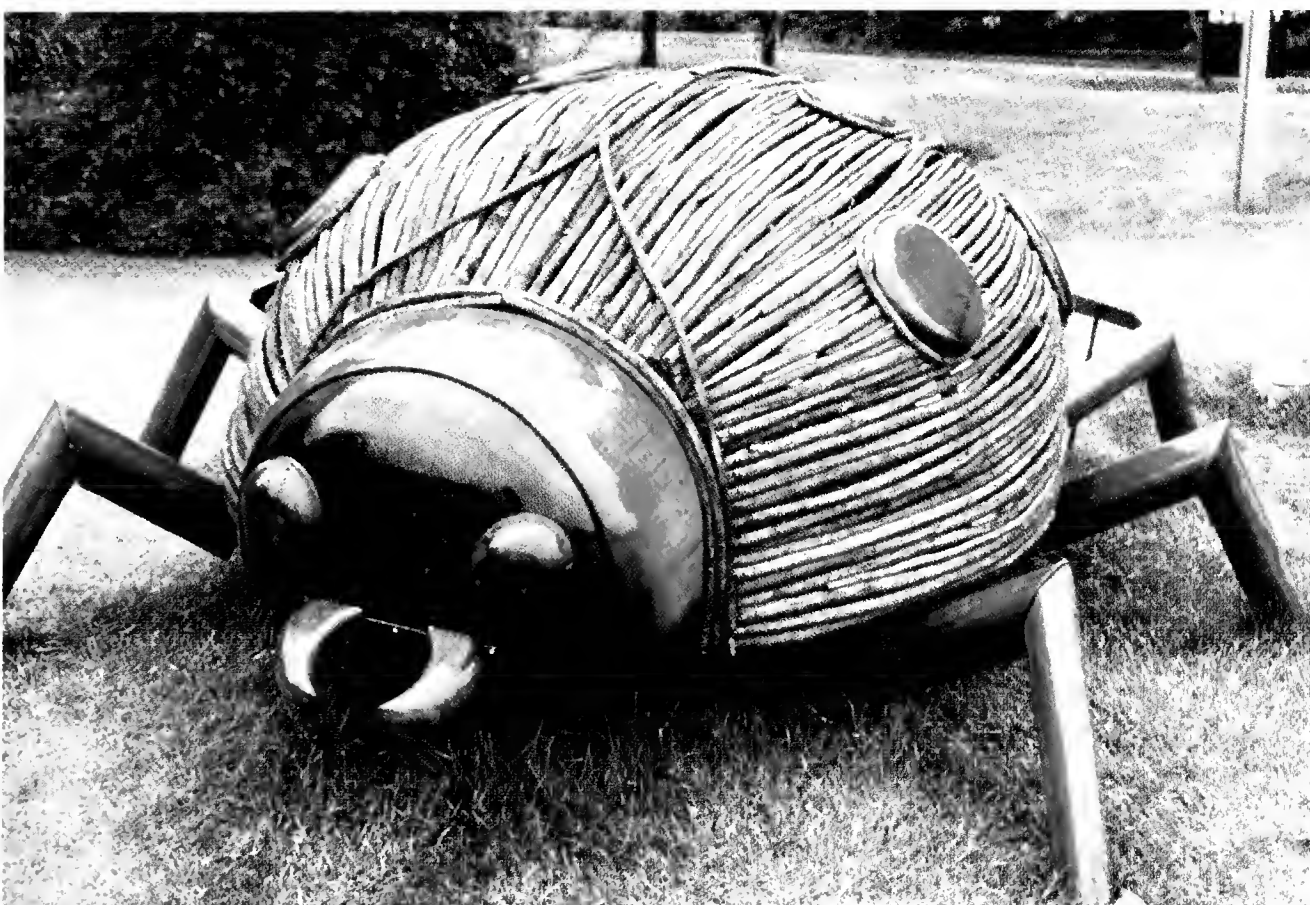
Giant ant sculpture

The second special exhibit to be featured at the Garden next spring is an art exhibit called Big Bugs, created by sculptor Dave Rogers. Mr. Rogers describes his art this way:

*These little creatures which we often take for granted outnumber us one million to one. Many live in communal groups working as one for the common good of all. Their ranks include engineers, soldiers, weightlifters, hunters, stalkers, gatherers, and even royalty. When you take this remarkable and diverse group of "hidden gardeners" and recreate them on a gargantuan scale, using*



Giant spider sculpture on a web



Giant beetle sculpture



Giant roach sculpture

*all-natural materials, you have the Big Bugs. The effect is a role reversal of dimension and perception.*

Stars of the Big Bugs show include a giant (twenty-five feet long) ant, a huge (seventeen feet wide) spider, and a very



Artist Dave Rogers working on his huge praying mantis sculpture

tall (twenty feet high) praying mantis. Ten different big bugs will be displayed throughout the Garden. •

# Continuing along the Arizona Trail

Article and photographs by Wendy Hodgson, M.S.

Continuing to tick off the miles along the Arizona Trail, Dr. Liz Slauson (Garden research associate), Amy Prince and Dawn Goldman (Garden volunteers), and I gather material for the flora of the Trail.

We have hiked more than 250 miles, collected more than 2,800 specimens, and made more than 1,200 photographs since beginning the project in April 2000. We continue to experience beautiful vistas within the Upper Sonoran and Painted Desert regions, ponderosa and Apache pine forests, and chaparral and oak woodlands.

Late in the autumns of 2000 and 2001 we hiked within Coronado National Memorial, at the starting point of the Arizona Trail on the lower flanks of the Huachuca Mountains. These mountains are exceptional in their high species diversity when compared to the known floras of other mountain ranges in the southwestern United States (Bowers and McLaughlin, 1996). The Huachuca Mountains are home to such plants as Apache pine (*Pinus engelmannii* Carr), Chihuahuan pine (*Pinus leiophylla* Schiede & Deppe var. *chihuahuana* [Englem.] Shaw), Lemmon's sage (*Salvia lemmoni* Gray),

Mt. Lemmon marigold (*Tagetes lemmoni* Gray), various types of brickelbush (*Brickellia* spp.), morning-glories (*Convolvulus* spp.), hoary yucca (*Yucca madrensis* Gentry), grasses, and oaks (*Quercus* spp.).

Even though we visited the area briefly when it was dry and plants were well past flowering, we added five previously undocumented species to the known flora of this protected area with a collection permit from Coronado National Memorial personnel. Higher up the mountains within Coronado National Forest we discovered a dandelion-like member of the sunflower family in fruit. Dr. Donald Pinkava at the herbarium at Arizona State University identified it as *Leibnitzia lyrata* (D. Don) Nesom, or Seemann's sunbonnets, a relatively rare herbaceous perennial known only from few populations in the mountains of southeastern Arizona, southwestern New Mexico and northern Mexico. We also found western sneezeweed (*Dugaldia hoopesii* (Gray) Rydb.), an otherwise common plant of higher elevations throughout the West. We opted not to collect it, only to learn later that the plant hasn't been seen or documented in the Huachuca



Looking for "rooster-tails" hiding amongst the Mexican poppies, guiding us along the trail.

Mountains since 1909. We were again reminded of the need to collect and document all that is flowering or in fruit along the Trail.

The winter and early spring rains produced a wildflower display unmatched by any other in the past four or five years. Liz and I concentrated on those parts of the Trail that passed through the deserts, particularly our own Sonoran Desert. Although parts of the Trail were not developed, we were able to follow routes by way of "rooster tails," metal tags, ribbons, and rock cairns placed by Tonto National Forest personnel, John Neeling (Director of Trails Operations for the Arizona Trail Association), and Chuck Horner, volunteer steward and trail developer. We had little trouble finding the routes although the red/white/orange rooster tails were well camouflaged in the frequent blankets of cryptanthas and yellow-orange Mexican poppies!

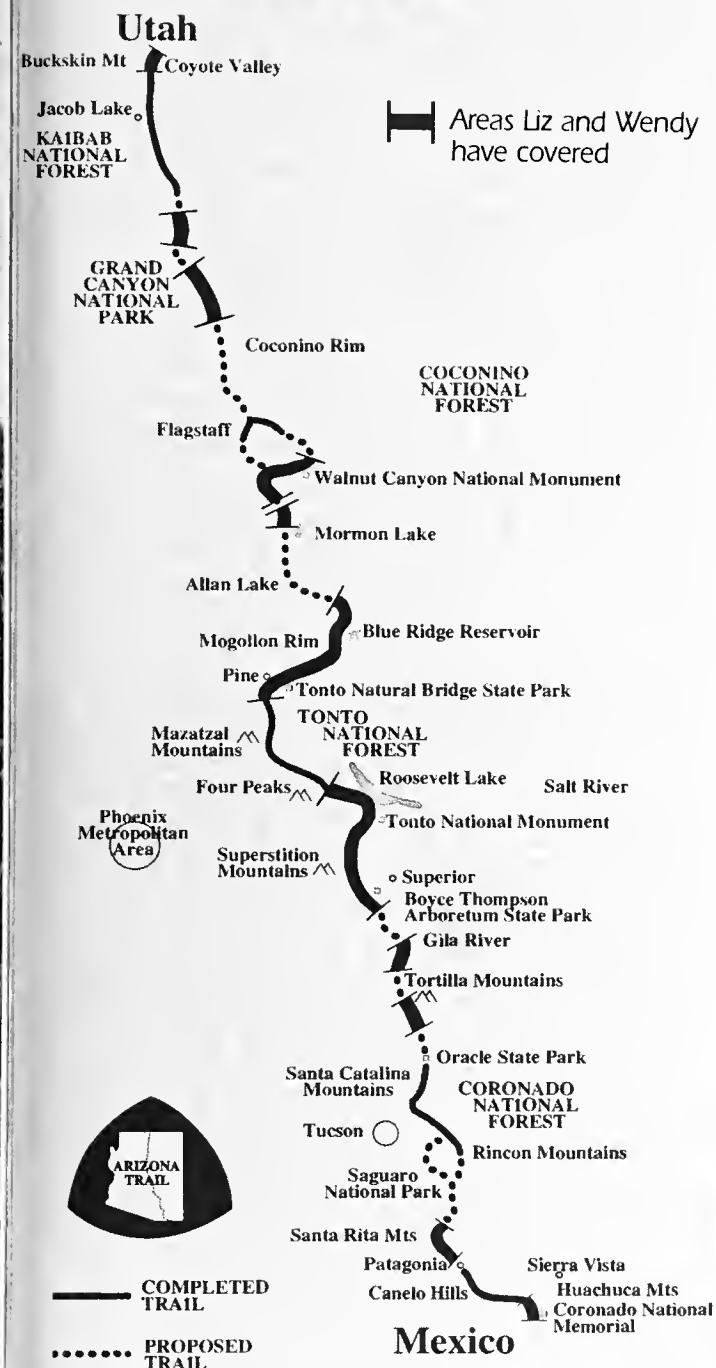
Particularly interesting and scenic are the routes from the Gila River near the tiny



Classic Upper Sonoran Desert, looking northeast from the Arizona Trail along Alamo Canyon Passage.

# The Arizona Trail

The Sonoran Quarterly WINTER  
December 2001 Volume 55, No. 4



White-flowered forms of owl's-clover, *Castilleja exserta* ssp. *exserta*.



town of Riverside south towards Freeman Road and from Roosevelt Bridge west towards Four Peaks. Another exceptional area through which the Trail passes is Whitford Canyon south past Picketpost Mountain and Telegraph Road adjacent to the White Canyon Wilderness Area. Magnificent distant high mountains, massive rock outcrops and lush, Upper Sonoran Desert vegetation reward the hiker on these moderately easy hikes.

We have numerous specimens awaiting identification and processing, and our knowledge of Sonoran Desert flora and ecology continues to grow. The late winter/spring ephemerals and perennial herbaceous species were common and their populations were composed of exceptionally large numbers of individuals. Cream-cups (*Platystemon californicus* Benth.),



Our native filaree, *Erodium texanum*, an attractive counterpart to the established exotic filaree, *E. cicutarium*.

whispering bells (*Euuneuanthe penduliflora* Benth.), Kennedy's mariposa-lily (*Calochortus kennedyi* Porter), rose and white-flowered owl's-clover (*Castilleja exserta* [Heller] Chuang & Heckard ssp. *exserta*), and the Arizona endemic red-beard tongue (*Penstemon subulatus* M. Jones) were commonly found within their respective habitats.

We also found, among numerous others, narrow-leaved flox (*Phlox tenuifolia* Nelson), gilia (*Gilia sinuata* Dougl. ex Benth.), blue and white-flowered lupines (*Lupinus* spp.), toad-flax (*Nuttallanthus texanum* [Scheele] Sutton), cryptanthas (*Cryptantha* spp.),

red-maids (*Calandrinia ciliata* [Ruiz & Pavon] DC.), a native filaree (*Erodium texanum* Gray), yellow suncups (*Cainissonia californica* [Nutt. ex Torr. & Gray] Raven), and tickseed (*Coreopsis douglasii* [DC.] Hall). New populations of the relatively rare perennial, Parish's Indian-mallow (*Abutilon parishii* Watson), were also found.

Rainy winters produce plants otherwise not seen in decades. Equally interesting is finding common plants growing in uncharacteristic habitats following relatively wet winters. Wild petunia (*Callibrochoa parviflora* [Jussieu] D'Arcy) is cited as occurring in arroyos, sandy areas, and washes by Shreve and Wiggins (1964) and Kearney and Peebles (1960). Miner's-lettuce (*Claytonia perfoliata* Donn ex Willdenow) usually occurs under the shade of desert trees and shrubs or along creeks. Finally, the diminutive rock-jasmine (*Androsace occidentalis* Pursh) normally grows on grassy hillsides and along streams and washes. We found all three plants occasionally



The Arizona endemic red-beard tongue, *Penstemon subulatus*, an otherwise uncommon perennial.



View from Arizona Trail overlooking Apache Trail (Route 88) and Roosevelt Lake.

growing in the open on dry granitic slopes above arroyos and creeks. This shows that they are not restricted to the more mesic (moderately moist) situations. Only in those winters experiencing sufficient rainfall and appropriate temperatures do seeds of these plants, stored in the soil's seed bank, germinate and grow on these otherwise dry slopes.

Adequate amounts of rain also contribute to the germination and growth of unwanted exotic plants such as Sahara mustard (*Brassica tournefortii* Gouan) and wallflower (*Erysimum repandum* L.). Not only are they unsightly competitors with native species, they are important summer fuel sources to desert wildfires. Happily, we have not yet encountered buffel grass (*Pennisetum ciliare* [L.] Link), another competitive, fuel-producing exotic, with any significant frequency along the Arizona Trail despite its abundance elsewhere in the Sonoran Desert.

With the progression of spring, we headed to the higher desert regions, specifically the Mohave Desert within the Grand Canyon and Painted Desert near the Arizona-Utah



Yucca that is believed to be a hybrid along the Arizona/Bright Angel Trail, Grand Canyon National Park.

border. The Grand Canyon, home to nearly half of the state's flora, continues to yield botanical surprises with diligent fieldwork. For example, soaptree yucca (*Yucca elata* Engelm. var. *utahensis* [McKelvey] Reveal) is locally common along the Colorado River near Phantom Ranch, growing in sand dunes. Banana yucca (*Yucca baccata* Torr.) is also common within the Canyon, but growing at higher elevations away from the river and dunes. We found what appears to be a



Indian-cabbage, *Caulanthus crassicaulis*, an attractive herbaceous perennial with inflated stems and maroon flowers.

hybrid between the two plants along the Arizona/Bright Angel trail, previously overlooked by those traveling by foot, mule, or raft. In flower, the plant is obviously different from what is believed to be its parents, having an inflorescence (flowering) that is longer than the short panicle of the banana yucca but shorter than the tall panicle of the soaptree yucca. Its leaves are also intermediate in size. I have documented this hybrid, or a form thereof, elsewhere

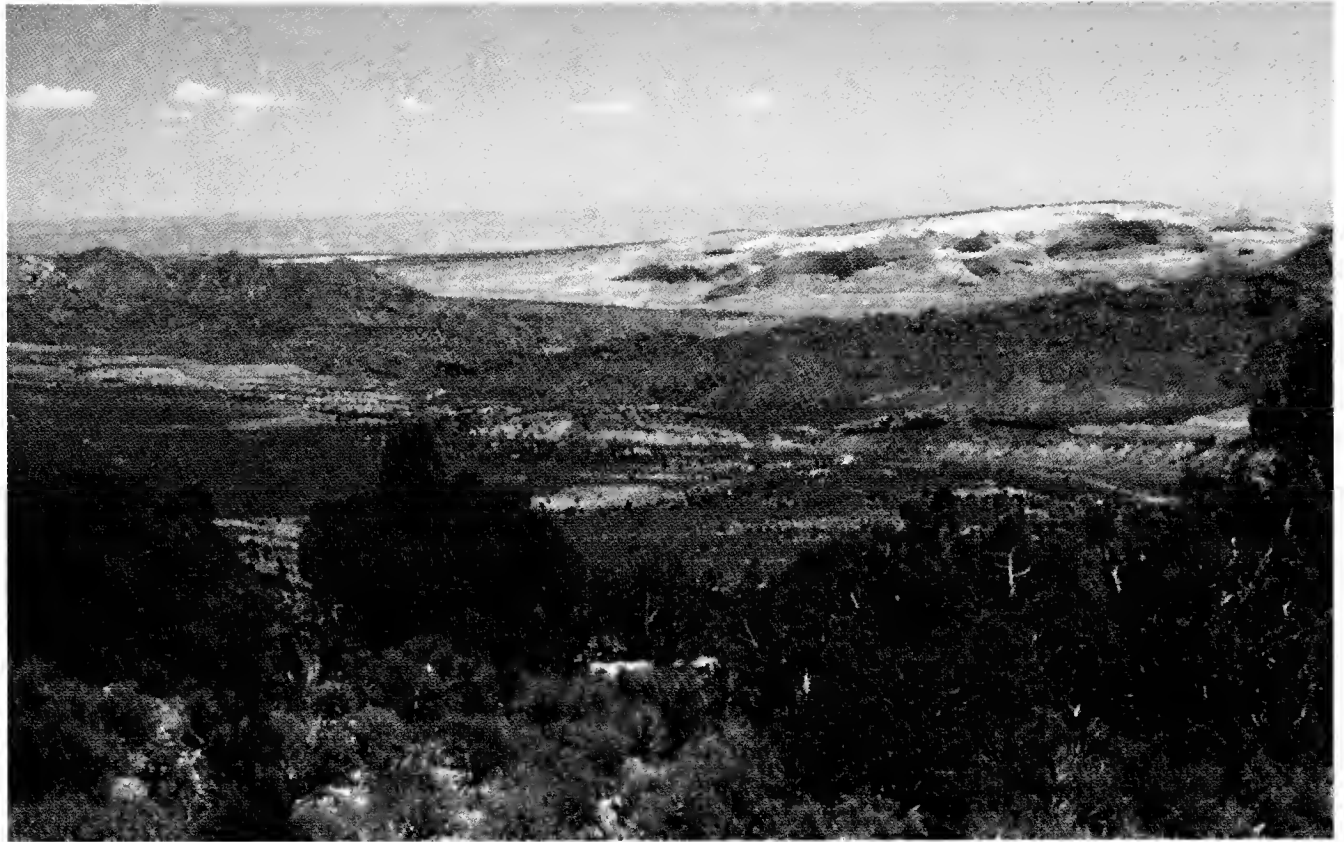
within and outside the boundaries of the Grand Canyon.

We returned to the North Kaibab Trail in September and found, amongst numerous other species, a new population of the very rare Arizona poppy, (*Argemone arizonica* Ownbey), known only from two other sites.

The Arizona Trail, proceeding north from the North Rim of the Grand Canyon, provides stunning views as it overlooks the Painted Desert to the east and north of the Kaibab Plateau. During May we hiked the newly developed trail north of Jacob Lake on land administered by the Bureau of Land Management. Its trailhead facilities at the northernmost point of the Arizona Trail are exceptional and provide easy access not only to the Trail, but also to the newly designated Grand Staircase-Escalante National Monument. Along this route we were excited to find the odd-looking Indian-cabbage (*Caulanthus crassicaulis* [Torr.] Watson) of the mustard family. It is nowhere common in Arizona and its tall, inflated stems and fuzzy maroon flowers make it an attractive, albeit unusual, part of the flora. Great Basin indigenous peoples ate the herbage, thus its common name. We also found the attractive Parry's blanket-flower (*Gaillardia parryi* Greene) known only from southern Utah and northern Arizona. During this time of the year the bright, cream-white inflorescences of slender-leaved yucca (*Yucca*



Sinuous mariposa-lily, *Calochortus flexuosus*, of the Painted Desert region.



Looking northeast towards Coyote Valley and Escalante-Grand Staircase region.

*angustissima* Engelm.) are in stark contrast with the red colors of the Navajo sandstone.

We have identified only a few hundred of the collected specimens. With nearly 2,400 more specimens to identify and thousands more to collect as we continue to cover the remaining 530 miles, our level of understanding the Arizona Trail and its plant communities will no doubt increase immeasurably.

Wendy Hodgson, M.S., a research botanist, is curator of collections and director of the herbarium at the Desert Botanical Garden.

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and Flora of the Sonoran Desert. Stanford University Press, Stanford, California.



Slender-leaf yucca, *Yucca angustissima* in Coyote Valley.

## Susan Shipka returns as Garden's controller

Susan Shipka re-joined the Garden business staff last

May as controller, a position in which she supervises the accounting department and all accounting functions. Earlier, she had worked for five-and-a-half-years in the business office as an accountant, leaving to be a fulltime mother.

Susan holds the Bachelor of Science degree in liberal arts with a minor in business from Arizona State University. She also has an Associate of Arts degree in accounting from Phoenix College and has worked in accounting for more than twenty-two years.

A third-generation Arizonan, she is married with five children ranging from ten years old to twenty-three.



Photograph by Jennifer Johnston

## New fragrance developed from Garden blossoms

The launch of a new fragrance will lead off the Garden's Grand Opening schedule of events next February.

The fragrance, called Desert Queen, is based upon the aroma of the flower of the Arizona queen of the night (*Peniocereus greggii*), a reclusive night-blooming cactus native to the Sonoran Desert.

Joann Petz, president of Once in a Bloom Fragrances, L.L.C., said she chose this fragrance "first because of the story behind the flower, that it is unique and mysterious. Then when I actually smelled the flower, I knew the fragrance was going to be beautiful. It is soft with a touch of sweetness which lifts the floral warmth of the scent in a pure interpretation of the flower's aroma."

To develop the formula for Desert Queen, she brought Felix Buccellato, famed as "Felix the Nose," on a ten-day visit to the Garden in June of 2000 to experience the blooming of



*Peniocereus greggii* (Arizona queen of the night)

a queen of the night flower. Buccellato, a perfumer and president of Custom Essences in New Jersey, is well-known as a "nose" in the world of fragrance, having the ability to remember scents with great accuracy and recognizing their essential and unique qualities. After memorizing the character of the scent released by the flower, Buccellato returned to his lab in New Jersey to interpret the natural aroma of the flower.

The Desert Queen fragrance line will include *eau de parfum* spray, body lotion, bath gel, a scented soap set, and a scented candle. A portion of the net proceeds from sales of Desert Queen *eau de parfum* spray will be donated to the Desert Botanical Garden.

Photograph by Jennifer Johnston

## Luminaries to Light New Garden Entrance

Ticket-holders attending this year's *Las Noches de las Luminarias* will see for the first time ever the Garden's beautiful new entrance illuminated with glowing luminaries.

More than seven thousand luminaries—paper bags aglow with lighted candles within—will line the Garden paths for the twenty-fourth year of the event, which will begin with a members' preview evening on Thursday, November 29, and continue for the public on Friday and Saturday nights, November 30 and December 1.



Tickets for the event are available only through advance sales. No tickets are sold at the door.

## Pat Smith Earns International Certification

Pat Smith, the Garden's volunteer administrator and assistant director of educational services, has become internationally certified as a volunteer administrator by the Association for Volunteer Administration (AVA). She is one of three hundred persons to earn this credential in the U.S. and Canada.

To be certified, she completed an extensive self-examination and management portfolio and passed a comprehensive exam administered by the AVA. This year 27 out of 43 applicants received the certification.

## The New Garden Shop

has more gifts and plants for the shopper



Photograph by Jennifer Johnston

Customers love the new Garden Shop. It offers the same ambience—friendly, cozy, rustic—of the old Garden Gift Shop but has many more selections.

Hundreds of desert plants are now displayed along with good advice about how to grow them.

The new Garden Shop, which opened in the first week of October, has been drawing rave reviews from customers.

"They come in and just say, 'Wow! I love this place!'," said Janis Munsil, manager.

The new space combines the Garden's old gift shop and plant shops, just about doubling the area formerly available for merchandise.

Light-colored, fragrant pine shelves, tables, and fixtures line the large, high-ceiling room. Customers find a wide array of tempting goods, including pottery, books, tee-shirts, caps and hats, food products, knick-knacks and decorative items. All items in the Garden Shop relate to the Southwest, the desert, or to gardening.

The plant shop, brightly illuminated with lights to keep plants healthy and growing, contains hundreds of specimens ranging from small cacti in plastic pots to large one-of-a-kind desert plants in specialty containers.

Janis said the new shop retains the rustic and cozy feeling which customers loved in the old gift shop, but it also offers a brighter, lighter space—and more shopping. It also includes considerably more space for storage.

Retail director of the Garden for two years, Janis runs the new shop with the help of three fulltime and seven parttime employees, as well as twenty-five volunteers. "I want to say we all really appreciate all the people who made this new shop possible," she said. "It is beautiful and comfortable, really a lovely place to hang out for forty hours a week."

## CALENDAR OF SPECIAL EVENTS

### *Las Noches de las Luminarias* — 2001

Thursday, Nov. 29 (Members' Preview);

Friday, Nov. 30, and Saturday, Dec. 1

5:30 to 9:30 p.m. No tickets sold at the door.

### Desert Botanical Garden Weekend AT the Great Arizona Puppet Theater

Wednesday through Sunday, Dec. 5 - 9

Come to the Great AZ Puppet Theater  
for special performances of "Hotel Saguaro."

302 W. Latham, in Phoenix

between Third and Fifth avenues

### Music in the Garden Concert Series

Sundays: Jan. 27; Feb. 3, 10, 17, 24; March 3, 10

11:30 a.m. to 1 p.m. on Ullman Terrace

optional brunch from 9:30 a.m. to 12:30 p.m.

call 480-941-1225 for reservations and information

## Desert Botanical Garden Grand Opening Celebration

### Special Spring Exhibits

Saturday, Feb. 23 – Sunday, May 12

### The Butterfly Pavilion

Dave Roger's

### Big Bugs Sculptures

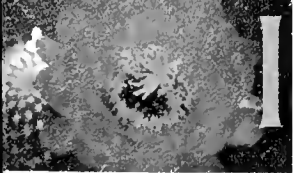


Members' Only Preview Festival Weekend: Feb. 16 & 17

Community Festival Weekend: Feb. 23 & 24

9 a.m. - 5 p.m.





The Desert Botanical Garden is grateful for the support of all 9,433 members. Recognized here are members of the President's Club, Director's Circle, Curator's Circle, Saguaro Society, and The Sonoran Circle. Also listed are donations and memberships received from July 1 to September 30, 2001, for Ocotillo Club, Boojum Club, Agave Century Club, and Desert Council.

## PRESIDENT'S CLUB

Jacquie & Bennett Dorrance  
Dorothea & Bradford Endicott  
Hazel Hare  
Edith & William Huizingh  
Dorothy Donnelley Moller  
Barbara & Donald Ottosen

## DIRECTOR'S CIRCLE

Connie & James Binns  
Marie Doepper  
Leigh & David Hann  
Rose & Harry Papp  
Penny & Richard Post  
Carol Schatt  
Louise Solheim  
Nancy & Robert Swanson  
Shoshana & Bob Tancer  
Connie & Craig Weatherup

## CURATOR'S CIRCLE

Carol & Robert Bulla  
Geri & Harry Cavanagh  
Kate & LeRoy Ellison  
Leo Martin  
Ann & Robert Mueller  
Marilyn & Jon Shomer

## SAGUARO SOCIETY

Anonymous (1)  
Becky & Ken Allison  
Rosa & Benito Almanza  
Gwynne & Jeffrey Anderson  
Sally Anderson  
Jeanne & Shreve Archer  
Nody & Quent Augspurger  
Billie Jane Baguley  
David Barnett  
Regina & G. Peter Bidstrup  
Virginia & Harry Bonsall  
Betty & Herbert Bool  
Oonagh & John Boppart  
Marilyn & William Boyce  
Nancy & Charles Brickman  
Jeanne Cameron  
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Anne & Fred Christensen  
Amy S. Clague  
Charlotte & Sidney Clark  
Susan Clark-Johnson & Brooks Johnson  
Karen & William Clements  
Patricia F. Cocking  
Lee Baumann Cohn & Mike Cohn  
Pat & Lou Comus  
Janet & John Cotton  
John Couleur  
Betty Jane & Kenneth Dahlberg  
Geri & Mike DeMuro  
Anna & Joseph DeSplinter  
David Dodge  
JoEllen & Philip Doornbos  
Julie & John Douglas  
Marilyn & Cliff Douglas  
Karen Enyedy & Robert Breunig  
Constance Estes  
Ardie & Steve Evans  
Betty & Bert Feingold  
Donna & Mark Feldman  
Susan Frank  
JoAnne & Harold Frede  
BJ & Jim Freeman  
Maggie & Kurt Freund  
Sheila & F. Michael Geddes  
Martha Gilbert  
Becky & Bob Gisburne  
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Pamela Grant & Dan Cracchiolo  
Heather & Michael Greenbaum  
Robin & David Hanna

Frank R. Hennessey  
Leandra & Charles Holland  
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Maurine & Jeffrey Kahn  
Faye & James Kitchel  
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The Desert Botanical Garden is honored to acknowledge the following individuals who have included the Garden in their estate plans.

Anonymous (18)  
Anonymous DBG Docent  
Gail & John Allan  
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Lou Ella Archer \*  
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A corporate membership category, Desert Council represents an alliance between the Desert Botanical Garden & the business community for donors of \$250 or more.

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APS

Palo Verde (\$10,000 +)  
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## HONORARY & MEMORIAL GIFTS

Honorary & memorial contributions are used to provide for the ongoing horticultural, education & research programs of the Desert Botanical Garden.

From July 1, 2001, to September 30, 2001, contributions have been received in honor of:

Frank & Hui-Fen Bell  
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Brian J. & Jami H. Schulman  
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From July 1, 2001, to September 30, 2001, contributions have been received in memory of:

**Bernard Baker**  
Nelson & Vera Ellen Hope

**Dale Skirving**  
John & Eugenia Story

**Evelyn Van Loo**  
Terry Johnson

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#### MEMORIAL TREES

Gifts through the Memorial Tree program provide for horticultural maintenance of the trees on the Center for Desert Living Trail. Contributions have been received in memory of:

**Warren Gaines**  
Dan & Dorothy Zusman

#### IN-KIND GIFTS

AdobeAir, Inc.  
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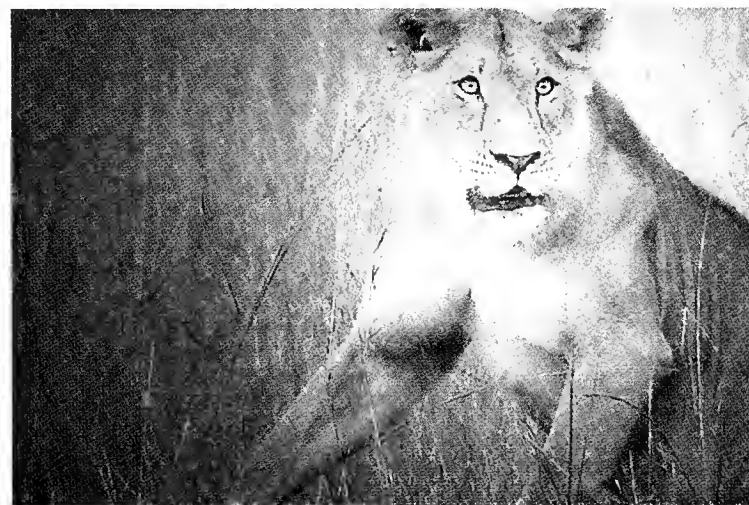
We attempt to ensure the accuracy of our donors' names. If you note an error or omission, please contact Samantha Childers at 480-481-8193.

## Garden Sponsors East African Photography Safari 14-day trip will feature stops in Kenya and Tanzania

Photography by Ken Schutz

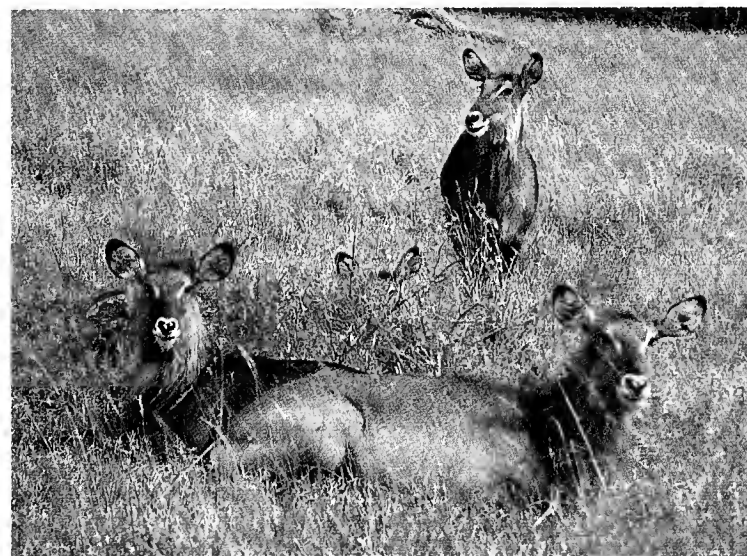
The Garden's executive director, Ken Schutz, will lead a trip next summer for members of the Desert Botanical Garden to East Africa's most famous game parks and reserves.

Highlights include Tanzania's Serengeti Plains and the Ngorongoro Crater, plus Kenya's Amboseli National Park and Samburu Game Reserve. A night at the Mount Kenya Safari Club is also part of the itinerary.



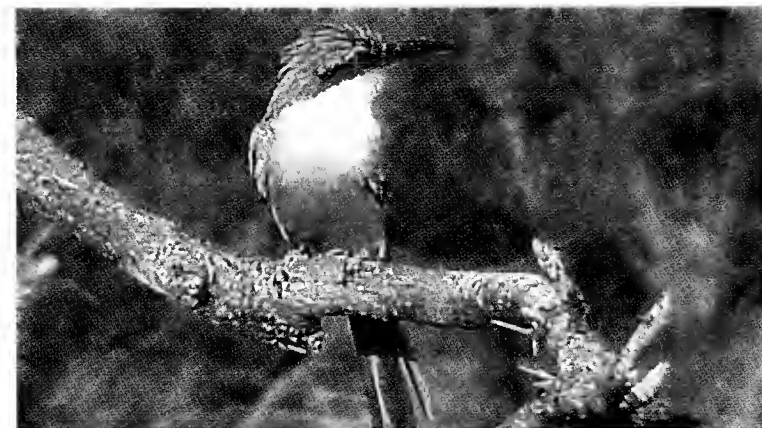
The Garden's East African safari is scheduled for June 13 through June 26, 2002, and will be the sixth that Ken has led. He first went as a trip leader for the Baltimore Zoo and, more recently, as a representative of the Science Museum of Western Virginia. In fact, Ken took the photos shown here this past summer during his most recent visit to Kenya.

Accommodations for the Garden's trip will be provided by East Africa's finest safari lodges and luxury tented camps. All camps included in the itinerary feature "in-tent" bathrooms and hot showers, comfortable beds, auxiliary electrical service, and freshly prepared meals by each camp's resident chef. Travel arrangements for the Garden's safari will be handled by International Expeditions—widely recognized as a leader in ecotourism—and their minimum-impact



travel philosophy of "take only pictures, leave only foot prints" will be evident throughout the trip.

The cost of the Garden's safari is \$5,698 per person, including roundtrip airfare from Phoenix. This participation fee also includes a tax-deductible contribution of \$500 to the Desert Botanical Garden. Please note that participation is limited to twenty persons, and reservations will be accepted on a first-come, first-served basis. All participants must be current members of the Desert Botanical Garden at the time of registration.



For a detailed itinerary or any other additional information, please contact Marcia Nickels at 480-481-8194.



# At the Garden Shop

## GIFTS AND PLANTS

The Sonoran Quarterly | **WINTER**  
December 2001 | Volume 55, No. 4

Order by fax  
480-481-8157,  
by phone  
480-481-8113,  
by e-mail:  
dbggiftshop@uswest.net

or by mail:  
DBG Garden Shop  
1201 N. Galvin Parkway  
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### Thirstystone Gift Baskets

Best selling coasters have been combined with beautiful coordinating elements to create these wonderful gift baskets. A perfect gift to give and receive, they are available in three assortments:



#### The Relaxation Gift Basket \$33

includes a mug and matching coaster, "Sounds for the Soul" compact disk, a candle holder, relaxing bath salts, a decorative accent towel, and a willow basket.

#### The Tea Time Gift Basket \$33

includes two coasters, a ceramic teapot & teacup, a designer tea bag rest, three Tazo tea bags, a tea towel, and a willow basket.

#### A Mini Gift Basket \$16.50

includes a sandstone coaster, matching mug, two Tazo tea bags, a porcelain scoop, and a wooden crate.

### Jim Sudal Pottery

Jim Sudal first started making pottery in the early 80s in Tucson when he was a student at the University of Arizona. After moving to Phoenix, where he worked for several years at the Desert Botanical Garden, Jim became a fulltime pottery artist. Jim's work is inspired by the beauty of the Garden and the Sonoran Desert. Jim's pottery is being collected and ranges from coffee mugs to large plates. **\$16- \$200**

### Cheri's Desert Harvest Gift Packs and Baskets

A taste of the desert from Cheri's Desert Harvest in Tucson. Cheri gathers cactus fruit from the Tucson area to make her famous prickly-pear jelly. She also offers a prickly-pear honey, a combination of prickly-pear juice and mesquite honey. They are all fabulous! Try any of her gift pack combinations.

Three Jelly Totem Pole \$11

Southwest Beer Bread Mix, Red Chile Pepper Jelly, Mesquite Honey \$15.25

Two-jar (8 oz. each) Jelly Crate \$17.75

Four-jar (5 oz. each) Jelly and Honey Crate \$22.50



### Holiday Cactus

It's holiday time! Our beautiful, traditional Christmas cactus plants in all their glorious colors are available at the Garden Shop. These *Schlumbergera* species are from the jungles of Central America and flower in December in lovely shades of white, pink, red, yellow, or combinations thereof.

They are wonderful as hanging baskets or in planters and make great hostess gifts and decorations for your home. **\$7 - \$30**



### Rock Art as Planters

Scottsdale native Steve Holmes of Lithic Vision starts with a real rock, makes a mold of it and from that casts a concrete version which he further shapes and cuts to resemble a fabulous planter. He then chooses the perfect plant, usually a succulent, to go into the containers. His work combines his two greatest passions: art and plants. Containers available with or without plants. **\$35 - \$200**

For more Garden Shop choices visit:  
**www.dbg.org or www.dbgselect.org.**



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